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Oklahoma Vocational Research Coordinating Unit, Stillwater.

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The National Conference on Research was one of nine held to discuss implementation of the Vocational Education Amendments of 1968. The purpose of this conference was to determine the increasing role and priorities of research in program development and to gather information for a research handbook. Major presentations were: (1) "Past, Present, and Future Priorities for Vocational Education Research," by D. Bushnell, (2) "Manpower Needs, National Goals, and Research Priorities in Vocational-Technical Education," by L. Lecht, (3) "Strategies and Responsibilities to Meet the Requirements of the Vocational Education Amendments of 1968 for Short-Term and Long-Range Needs," by G. Brandon, (4) "Information Services for Improvement of Vocational Education," by T. Clemens, (5) "Strategies for Correlated Interface Relationships Between the Total State Programs and Local Programs of Research," by G. Swanson, (6) "Strategies for Translation of Research Results into Change Factors in Regular Vocational Education Programs," by L. Walsh, (7) "Strategies for Developing Model Annual and Long-Range Program Plans for Research at State and Local Levels," by J. Moss, Jr. and J. Malinski, and (8) "Strategies for Emphasizing the Utilization of Local Environment in Community Action Research," by C. Shack. A summary of subsequent small group discussions is included. (DM)

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P. 29



PROCEEDINGS

NATIONAL
CONFERENCE on
RESEARCH

1968
VOCATIONAL
EDUCATION AMENDMENTS

C OORDINATING
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R ESEARCH in
V OCATIONAL
E DUCATION

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OKLAHOMA STATE UNIVERSITY / STILLWATER

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PROCEEDINGS: NATIONAL CONFERENCE ON RESEARCH

1968 VOCATIONAL EDUCATION AMENDMENTS. /

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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3 Oklahoma
Vocational

Research Coordinating Unit,
Oklahoma State University
Stillwater, Oklahoma
April, 1969

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PREFACE

The National Conference on Research - 1968 Vocational Education Amendments was one of nine national conferences supported by the U.S. Office of Education to discuss implementation of the Vocational Education Act of 1963, as amended by the Vocational Education Amendments of 1968. The purpose of this conference was to determine the increasing role of research in the development of local and state vocational-technical education programs; and to determine the direction of research with selected state and local educators, business, labor, and community leaders who are vitally concerned with comprehensive programs in the field of vocational and technical education.

This conference was not arranged with an eye to the publication of these Proceedings, but rather to the publication of a research handbook for vocational-technical educators. The Proceedings are published solely as a compilation of resources providing background for the research handbook. Primary distribution of the Proceedings will be at nine regional clinics to participants who will need results of the National Conference in order to react to a draft of the research handbook.

The total project includes the National Conference as its first activity, followed by presentations at the regional clinics, and will be culminated by publication and distribution of the Research Handbook for Vocational-Technical Education. The objectives to be attained by the project are:

1. To identify research needs in vocational and technical education for both the States and the U.S. Office of Education.
2. To explain and discuss new authorization, rules and regulations, and proposed guides for research in vocational education.

3. To develop techniques for effective coordination with local and state governmental and non-governmental institutions and agencies who have a concern for vocational and technical education programs.
4. To develop increased leadership capabilities for selective dissemination of research findings to supervisors, teacher educators, administrators and public school teachers.
5. To develop a guide for the organization of state plans for research and development with suggestions for integrating these plans by USOE with research funds available to the communities.
6. To give leadership in the development of annual and long range program plans for research and development.

We are grateful to Dr. Otto Legg and Dr. Bruce Blackstone of the Bureau of Adult, Vocational and Library Programs, Division of Vocational and Technical Education, USOE, who, together with our staff, formed the planning committee for the conference. We are especially indebted to Ed Apple, Project Assistant, who acted as conference coordinator and was responsible for the recording of activities during the Conference.

William D. Frazier
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NATIONAL CONFERENCE ON RESEARCH

**February 18, 19, 20, 1969
Sheraton-Oklahoma Hotel
Oklahoma City, Oklahoma**

The conference papers will be presented in the Ballroom. Small group sessions are scheduled for separate conference rooms.

NATIONAL CONFERENCE ON RESEARCH

**1968 Vocational
Education Amendments**

PURPOSE OF THE CONFERENCE:

To determine the increasing role of research in the development of local and state vocational-technical education programs; and to determine the direction of research with selected state and local educators, business, labor, and community leaders who are vitally concerned with comprehensive programs, in the field of vocational and technical education.

OBJECTIVES:

1. To identify research needs in vocational and technical education for both the States and U.S. Office of Education.
2. To explain and discuss new authorization, rules and regulations, and proposed guides for research in vocational education.
3. To develop techniques for effective coordination with local and state governmental and non-governmental institutions and agencies who have a concern for vocational and technical education programs.
4. To develop increased leadership capabilities for selective dissemination of research findings to supervisors, teacher educators, administrators and public school teachers.
5. To develop a guide for the organization of state plans for research and development with suggestions for integrating these plans by USOE with research funds available to the communities.
6. To give leadership in the development of annual and long range program plans for research and development.

TUESDAY, FEBRUARY 18

8:00 Registration

Chairman—Tuesday Morning

DR. FRANCIS TUTTLE, State Director, Oklahoma State Department of Vocational-Technical Education

8:30 Welcome

HONORABLE DEWEY F. BARTLETT, Governor of the State of Oklahoma

Introductory—"PERSPECTIVES & PRIORITIES FOR VOCATIONAL EDUCATION RESEARCH"

MIL. DAVID S. BUSHNELL, Division of Comprehensive and Vocational Education Research, Bureau of Research, USOE

9:00 Topic I—"MANPOWER NEEDS, NATIONAL GOALS, AND RESEARCH PRIORITIES"

Presented by DR. LEONARD LECHT

Dr. Lecht is Director of the National Planning Association's Center for Priority Analysis. The Center is concerned with research in estimating the dollar costs and manpower requirements for pursuing national objectives in such areas as education, health, research and development, social welfare, transportation, and urban development. Dr. Lecht is the author of *Goals, Priorities, and Dollars—The Next Decade*, and of *Manpower Needs for National Goals in the 1970's*. He received a Ph.D. degree in Economics from Columbia University. Dr. Lecht has taught at the University of Texas and Carleton College, and he was chairman of the Department of Economics at Long Island University.

9:45 Questions and Reactions

10:15 Coffee Break

10:30 Small Group Discussions—Implications for Research Process and Utilization

11:15 Summarization of Small Group Discussions

12:00 Lunch

Chairman — Tuesday Afternoon

DR. OTTO LEGG, Bureau of Adult Vocational and Library Programs, Division of Vocational and Technical Education, USOE

1:15 Topic II—"STRATEGIES AND RESPONSIBILITIES TO MEET THE REQUIREMENTS OF P.L. 90-576 FOR LONG AND SHORT RANGE RESEARCH NEEDS"

Presented by DR. GEORGE BRANDON

Dr. Brandon has his Ph.D. from Ohio State University and is Professor in Residence, Advisor to the Director of the American Vocational Association. He has recently been Director of Vocational Teacher Education and Head of the Department of Vocational Education at Pennsylvania State University and is on leave from Penn State at the present time. Previously he was on the staff at Michigan State University, Ohio State University, and taught in local public schools at Columbus, Marion, and Metamore, Ohio.

2:00 Questions and Reactions

2:30 Coffee Break

2:45 Small Group Discussion—Implications for Research Process and Utilization

3:45 Summarization of Small Group Discussions

WEDNESDAY, FEBRUARY 19

Chairman—Wednesday Morning

8:00 Topic III—"STRATEGIES FOR COORDINATION OF VOCATIONAL EDUCATION RESEARCH INCLUDING FEDERAL, STATE AND LOCAL, LONG AND SHORT RANGE MANAGEMENT INFORMATION REPORTING OF PRESENT AND PROJECTED RESEARCH STATUS AS WELL AS PROCEDURES TO DEVELOP SYSTEMATIC DISSEMINATION OF RESEARCH DATA AND FINDINGS"

8:40 Questions and Reactions

9:00 Small Group Discussions—Implications for Research Process and Utilization (Coffee Break)

10:00 Summarization of Small Group Discussions

10:30 Topic IV—"STRATEGIES FOR DEVELOPING CORRELATED INTERFACE RELATIONSHIPS BETWEEN TOTAL STATE RESEARCH PROGRAMS AND LOCAL RESEARCH PROGRAMS"

11:15 Questions and Reactions

11:45 Lunch

Chairman—Wednesday Afternoon

1:00 Small Group Discussion—Implications for Research Process and Utilization

1:45 Summarization of Small Group Discussions

2:15 Coffee Break

2:30 Topic V—"STRATEGIES FOR TRANSLATION OF RESEARCH RESULTS INTO CHANGE FACTORS IN REGULAR VOCATIONAL EDUCATION PROGRAMS"

3:10 Questions and Reactions

3:30 Small Group Discussion—Implications for Research Process and Utilization (Coffee Break)

4:30 Summarization of Small Group Discussions

DR. DUANE M. NIELSON, Organization and Administrative Studies Branch, Bureau of Research, USOE

Presented by MR. THOMAS D. CLEMENS

Mr. Clemens has a M.S. in Education from the University of Wisconsin. He is presently on leave from the Bureau of Research, Office of Education, where he is Director, Division of Information Technology and Dissemination. He has been in the Bureau in some research capacity since 1960. His leave of absence is to the Brookings Institution as a Federal Executive Fellow. His research topic there is "The Role of the Federal Government in Fostering the Installation of Research-Based Changes in Educational Institutions and Agencies." Before going to the Bureau of Research, Mr. Clemens was on the staff at San Jose, California State College, and research assistant at the University of Wisconsin.

Presented by DR. GORDON I. SWANSON

Dr. Swanson is Professor of Agricultural Education and Coordinator of International Education in the College of Education of the University of Minnesota. He has been a fellow for the American Association for the Advancement of Science. He is a member of the Joint Advisory Committee to UNESCO, Food and Agriculture Organization, and The International Labor Organization. He has written numerous journal articles and chapters in books.

DR. BRUCE BLACKSTONE, Bureau of Adult Vocational and Library Programs, Division of Vocational and Technical Education, USOE.

Presented by MR. LAWRENCE WALSH

Mr. Walsh is Senior Editor of Distributing and Marketing for the Gregg Division of McGraw-Hill Book Company. He holds a B.A. in Business Administration from the College of the Holy Cross, Wister, Massachusetts, and has completed graduate work in Distributive Education at Montclair State College, Montclair, New Jersey. He is a member of the National Council for Small Business Management Development and the National Management Development Council for Distributive Education.

THURSDAY, FEBRUARY 20

Chairman—Thursday Morning

9:00 Topic VI—"STRATEGIES FOR DEVELOPMENT OF MODEL ANNUAL AND LONG RANGE PROGRAM PLANS FOR RESEARCH AT STATE AND LOCAL LEVELS"

9:45 Questions and Reactions

10:15 Coffee Break

10:30 Small Group Discussion—Implications for Research Process and Utilization

11:15 Summarization of Small Group Discussions

12:00 Lunch

Chairman—Thursday Afternoon

1:15 Topic VII—"STRATEGIES FOR EMPHASIZING THE UTILIZATION OF LOCAL ENVIRONMENT IN COMMUNITY ACTION RESEARCH"

2:00 Questions and Reactions

2:30 Coffee Break

2:45 Small Group Discussion—Implications for Research Process and Utilization

3:45 Summarization of Small Group Discussions

4:30 Adjournment

DR. MAURICE RONEY, Head, School of Occupational and Adult Education, Oklahoma State University

Presented by DR. JERRY MOSS and MR. JOE MALINSKI
Dr. Moss has his Ed.D. from the University of Illinois. He has been on the staff at Purdue University and the University of Minnesota, where he is Professor of Industrial Education and Co-Director of the Minnesota Research Coordinating Unit. Jerry has had occupational experience in the printing industry and was a printing instructor at Danville Technical Institute in Virginia. Among other duties he is currently a member of the National Manpower Advisory Committee, Research Subcommittee.

Mr. Malinski is Director of Vocational-Technical Program Planning and Development Section in the Minnesota State Department of Education. This section has responsibility for the development of long-range program plans and budget projections. He received his B.S. degree from the University of Minnesota and has directed a national conference on planning, programming, and budgeting for the Vocational-Technical Education Center at the Ohio State University.

DR. HAROLD HASWELL, Director, Educational Research, Region VII Office, USOE

Presented by MRS. CHRYSTINE SHACK
Mrs. Shack is a native of Tennessee, has her M.A. from Rider College, and is presently Supervisor of Business Education for New Jersey. Her professional history includes experience as Teaching Principal, Cranbury School, Migrant Demonstration Schools; and Critic Teacher, Trenton State College and Rider College. She has prepared a number of television documentaries which focused attention on the education of migrant children.

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This conference is conducted by the Research Coordinating Unit at Oklahoma State University pursuant to a grant with the Office of Education, U. S. Department of Health, Education, and Welfare.

DISCUSSANTS

Commenting on the papers and leading the discussion throughout the conference are two well-known vocational educators:

MR. R. D. ANDERSON is the Executive Secretary of the National Association of State Directors of Vocational Education. Prior to assuming this responsibility, R. D. Anderson spent 41 years in the service of vocational education in South Carolina: 14 years as state director; 8 years as state supervisor of vocational agriculture; 9 years as a district supervisor; and 10 years as a teacher of vocational agriculture.

MR. DAVID S. BUSHNELL is Director of the Division of Comprehensive and Vocational Education Research, Bureau of Research, USOE. His B.S. and M.S. degrees are from the University of Chicago. He taught at the University of Washington and the University of Chicago. He spent three years as a research social-psychologist at the Stanford Research Institute directing research on the application of new educational methods to educational problems. His industry experience includes six years with IBM Corporation as a personnel administrator.

WELCOME

The Honorable Dewey F. Bartlett
Governor of the State of Oklahoma

(Transcribed from the tape-recording of informal remarks
made by the Governor.)

Your field to me is one of the most exciting fields and I would say particularly exciting in the educational area. I feel that the role of vocational-technical education is just beginning to be realized as important as it actually is in the total scene, the total spectrum of education. I also feel that the role of vocational-technical education is going to be different in the different states. I will be speaking more about Oklahoma since I am most familiar with this state. Perhaps some of the things I say may have significance in other states.

But first, I think, we need to look at total education. What is the goal? I feel that perhaps education has failed rather severely. For this, do not indict those in education nor those in vocational education. I think it is an indictment of my generation - your generation. I think too often the goal of education has been education. One important goal is being productive - being individually capable of performing work. This productivity may be the result of vocational-technical education or four years of college, six years of college, or many more years of college.

The dignity of work must very definitely be recognized. This was brought out clearly in John Gardner's book, Excellence. This value of vocational-technical education in the total picture of education is the fact that competency in a specific field is a worthwhile goal - to have a most excellent plumber just as we would have a most excellent doctor. Now if you have a plumbing leak on a Saturday, you will have that point brought home very clearly.

Our overall state plan for economic development in Oklahoma has been echoed in the program that has been adopted by the Ozarks Regional Commission in the four-state area of Arkansas, Kansas, Missouri, and Oklahoma. The plan submitted by Oklahoma was in substance adopted in total. We found out in looking at our area that we had an income gap, that we were below the national average in individual income. It was realized that if we could close the income gap and increase the productivity of individuals there would be a great increase in taxes coming to the state. Increased revenues would enable the state to provide those services that a state of average per capita income can provide.

How can this be accomplished? We realized that first we needed to provide better training - vocational-technical education. We needed to place emphasis on those things that lead to an expansion of our economy. And what really does lead to the expansion of the economy of any state - that is the expansion in the private enterprise sector? My job and the salary I receive and the salary that you gentlemen receive is a load on the economy of our respective states. Hopefully,

we are productive in teaching, in leading, in assisting our states to expand financially and to help people fulfill their goal in life. The private enterprise sector supports government, education, and many facets of our life. This is the area that is truly productive and the one which in Oklahoma needs to grow and become even more productive.

I campaigned on more and better jobs. To bring this about we needed to engage in a very vigorous industrial development program. This really becomes the backbone of our total state plan and is involved very intimately with vocational-technical education.

Just looking back on the racial tensions of the summer of 1967, we had already studied the program that was put into effect in the Watts area, a business program designed to employ more Negroes. We started in the summer of 1967 with a Full Employment Commission. The Commission's goal was to provide employment for the disadvantaged, appealing to existing industries to take part. This was about a year ahead of President Johnson's Alliance of Businessmen's Program. Of course, ours didn't have any financial support for those cooperating; but within four months the number of Negroes employed in Oklahoma went up 15% and the number of Indians employed rose by 11%. Then those in the Full Employment Commission realized that there were many other disadvantaged people needing jobs who didn't have the required skills. We developed a loan program through which we have been loaning money to unemployed or underemployed people. This appears to be successful. We have a grant from the Ford Foundation to continue and to expand this program.

In 1967 we made a study of our vocational-technical educational system and found that we needed to make several changes. These are changes that I think should be a part of any good flexible system. I think it is most important for vocational-technical education not to fall into the trap that other education has - the trap of inflexibility in the curriculum, inflexibility to change through research such as you represent. We must find ways to become more effective. Inability to change for better performance in your particular area of endeavor is a danger to any program. We found that it was important to have on the State Board for Vocational-Technical Education businessmen who would have a real responsibility for the program. Through these board members those in vocational-technical education will continually be reminded of the needs of industry in Oklahoma so that programs may be provided to meet those needs.

We also found that we could have a much more flexible program if the state owned the equipment for training in our various schools. So we changed over to this program and, having the state-owned equipment, we can set up special school programs tailor-made to the needs of industry, anywhere in the state. We are not tied to a particular brick-and-mortar building but we can provide vocational-technical education on a tailor-made basis - tailor-made to the needs of a specific industry. This training program is available to new industries or existing industries. This ability to train on the spot according to the needs of industry becomes a tremendous tool in attracting new industries or encouraging expansions within our state.

In industrial development, the three key areas are, in my opinion, the availability of labor, the availability of facilities to train the labor, and capital. So industrial development and economic development go hand in hand with vocational-technical education.

This becomes the backbone of the ability of a state to deal with other problems such as the hiring of disadvantaged. Training is very important in a program of providing employment for the disadvantaged. It is important in any program of hiring the disadvantaged to have an aggressive industrial development program where more and better jobs are being created. It is impossible or at best very difficult to provide job opportunities for disadvantaged people if the economy of the state or of the region or the community is not expanding - if there are not additional jobs being created.

Industrial development and vocational-technical training become extremely important to the economic development plan of a state. This is the reason we are putting a much higher percent of monies in vocational-technical education. We believe that we are making tremendous progress and realize that we need to do much more.

In 1966 the dollars invested in Oklahoma on new construction spent for expansion of new industry amounted to \$50 million, a very low figure. In 1967 it was \$69 million. Last year it was \$150 million. We had an announced \$135 million for 1969 before the year started and we have a goal of \$300 million of new construction this year which we will reach. The key to this is vocational-technical education along with a very aggressive industrial development program. The two go hand in hand. We feel that those in vocational-technical education should be very closely identified with, and a part of, industrial development efforts - making calls on prospects, showing prospects who are interested in establishing a plant in our state what the training facilities are, and how their people may be trained.

Getting back to my original point, I think it is most important in all of education that we accentuate the importance of people being able to produce, to be independent, to be productive. Because of your particular interest, I think you, perhaps, better than others, can play an important role in changing the concept in total education. I think it shows that we are failing when we have boys and girls leave our educational system at, for example, grade 10, without the ability to handle a skilled job of any kind. I think our system should be restructured so that a person after ten years in an educational system would be able to be employed in more than an unskilled job. This is going to require a change of attitudes, not on your part, but on the part of the people across the nation.

I find, too, as I know you have, that many people are very concerned that one single individual student capable of college work might be convinced by a counselor or by a vocational teacher that he should take vocational-technical education. Yet, because he could go on to college, they think this is a disaster. This, of course, is not the case at all. Many of the vocational-technical instructors whom I know first developed their skill in a particular area and used that skill

to go on to college. They became certificated to teach and entered our system showing that the development of a skill is clearly a part of a whole educational process. It is a very definite incentive to further education. It is not a stopping point. It is a beginning of an interest in learning, so essential to the full development of an individual.

We need to change the attitudes of many people to make them realize that a skill is not only important and that the dignity of work is not only important but that skilled training is a very basic part and a very needed part of the educational system and that it should be greatly expanded. I repeat, I think we fail when we have someone in our educational system for ten years who terminates his education at that point and is not capable of holding down some skilled job.

So I think you are in a very challenging and exciting profession at a very exciting time. You have the opportunity of creating new emphasis on the value of vocational-technical training, of focusing more attention on the importance of occupations, of improving training programs so that the value and the dignity of work is emphasized.

We are hoping in our whole system of education, starting next year, to put emphasis in the early grades on the old aphorisms of Benjamin Franklin and others about the dignity and value of work. We hope to start in various courses a smattering of economics; to stress the importance of work; the importance of an individual being productive and self sufficient as well as enlightened in the area of good citizenship. But certainly a person is a much better citizen and can much better exercise his rights of citizenship and his responsibilities of citizenship if he is productive, if he is capable individually of supporting himself and his family.

You have a great and exciting challenge. I wish you success in your conference. I certainly want you to know that you have my full support in your endeavors to create proper guidelines for the Vocational-Technical Education Act of 1968. Adopt a flexible frame of mind so that vocational-technical education will not become rigid but that it will be flexible, atuned to the demands of your state, atuned to the demands of industry, atuned to the demands of individuals wanting to be fully independent, to support themselves, to be productive, to be much further enlightened by the total educational process - not only in schools but in life itself.

PAST, PRESENT, AND FUTURE PRIORITIES FOR
VOCATIONAL EDUCATION RESEARCH

David S. Bushnell, Director
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Four years ago, before the annual meeting of State Directors, I made the prediction that if the implications of the new Vocational Education Act of 1963 were fully realized, vocational education in the United States would no longer serve as an end to formal education but would be a beginning. That expectation to a large extent has been realized. At that time I dedicated myself and my staff to providing several kinds of services to support what was then a budding vocational education research community. First, we hoped to stimulate and implement research to generate alternative strategies for more effectively serving an expanded community of vocational education students. Secondly, we offered assistance to those seeking grants so that they could plan and write effective research proposals. Third, through seminars, workshops and summer institutes, we hoped to aid in the development of new research talent as well as in strengthening the skills of those already identified with vocational education research. Fourth, we sought to expand and strengthen state research capabilities. Fifth, we pledged ourselves to continuing efforts to exploit and disseminate meaningful research results. I now look back upon those commitments and can state with some degree of assurance that those goals have been achieved. With pride, I can sight the fact that we now have two successfully operating Research and Development Centers, some 47 Research Coordinating Units throughout the country, a Vocational Education Information Clearinghouse, and over 5,000 teachers, administrators, and researchers trained through 4(c) grants. And, happily, over 500 studies have been completed since the implementation of the R & D program in November of 1964.

If someone were to carry out an intensive content analysis of the origin of articles recently published in the AVA Journal or the types of papers presented at the AVA Annual Convention, I feel certain that he could identify a substantial number growing out of vocational education sponsored R & D efforts.

Much of the success of the research program, of course, is directly attributable to many of you in this audience who have actively participated in structuring and conducting well-designed research. But the road has not always been as free from ruts and false starts as perhaps my statements might imply. You have only to look at the special Fall issue of the Journal of Industrial Teacher Education¹ on research policies governing vocational and technical education to realize that there are those whose viewpoints are not as rosy as mine. Yet even among the critics, as evidenced in the various papers published in this Journal, contradictory observations are made. There were those who argued that we should have been more attentive to short-term applied research problems; others observed that more of the money should have been allocated in support of basic and longer-term research.

Some were critical of our failure to offer ample support for the development of new research talent, while others thought we should involve more practitioners. To these critics I can only respond that we have followed a consistent and carefully chosen path and attempted to avoid the soft shoulders and booby traps into which we could have easily stumbled had we been too applied or too basic or too political in our orientation. To both our supporters and our critics, I can only say it has been a period of enjoyable but sometimes bruising associations.

Today's conference, however, is designed not to look backwards, but, hopefully, to move forward, to build upon the successes and failures of the past. It is a new beginning--with new opportunities for closer cooperation between local, state, and Federal representatives.

With the passage of the Vocational Education Amendments of 1968, we look forward to a period of shared research effort. What the nature of that research will be and how it will be implemented is, of course, the object of our discussion for the next three days. It would be fitting, I feel, at this moment, to quote to you a statement by the House Subcommittee on Education of the Congress after it concluded many weeks of hearings on the Vocational Education Amendments. The Committee makes the following five recommendations:

- (1) Any dichotomy between academic and vocational education is outmoded; (2) developing attitudes, basic educational skills and habits appropriate for the world of work are as important as skill training; (3) prevocational orientation is necessary to introduce pupils to the world of work and provide motivation; (4) meaningful career choices are a legitimate concern of vocational education; and (5) vocational programs should be developmental, not terminal, providing maximum options for students to go on to college, pursue post-secondary vocational-technical training, or find employment.²

The Committee goes on to observe that "occupational" preparation should become more specific in the high schools and not limited to only one vocation. Instruction should not be overly narrow, but instead should be built around significant families of occupations or industries which promise expanding opportunities. Thus, a student can leave the program with a serviceable skill, but is challenged to pursue post-secondary education. Occupational education should be based on a spiral curriculum which treats concepts of higher and higher levels of complexity as a student moves through the program. Vocational preparation should be used to make academic education concrete and understandable and academic education should point out the vocational implications of all education. We of the research community should feel very comfortable with this definition of the scope of vocational education. How to provide tested strategies and alternatives to better those current practices which need updating and revision will, hopefully, be one of the prime objectives of our discussion during the next three days. We have, as you can readily observe from the list of speakers and participants, an outstanding group of pilots to guide us on this new venture.

During my remaining minutes, I would like to state what have been the guidelines or touchstones for the Division of Comprehensive and Vocational Education Research in the Office of Education, that is, what have been our operational definitions of research, developmental programs, demonstration efforts, and dissemination.

Research in general should serve to advance man's knowledge and provide a basis for the invention of new and improved approaches to the solution of current problems. A trained researcher will set forth his hypotheses, examine those variables which are relevant to it, relate, usually through an experimental design, independent and dependent variables, collect and analyze appropriate data, and, of course, draw appropriate conclusions from those data. Well designed research studies are replicable by others and generalizable to similar sets of variables. Applied research, while following a similar procedure, is by definition more concerned with the solution to immediate and pressing problems than it is with the longer term commitment to the systematic advancement of knowledge.

Developmental studies are usually directed at the introduction of new innovations into a specific environment in order to modify the outcomes of whatever actions occur in that environment. Developmental programs seek to invent and engineer new solutions while research seeks to add to our storehouse of knowledge.

Demonstration programs, on the other hand, while frequently based upon developmental efforts, require careful evaluation of the results in order to ascertain whether or not this form of intervention is better than a more traditional or commonly used form.

Lastly, dissemination seeks to inform those responsible for carrying out a given program about new and related results which may lead to the adoption of improved procedures or methods.

Each of these activities has its proper role in the resolution of significant problems faced by the vocational educator and each is fundable as a legitimate expenditure under Part D of the present Vocational Education Amendments (90-576). The Vocational Education Act only authorized, as most of you know, monies for demonstration, development, and research efforts. The Vocational Education Amendments of 1968 authorized monies for demonstration, development, research and dissemination efforts.

During the past 18 months, the Bureau of Research, in close cooperation with the other Bureaus within the Office of Education, our own Research Advisory Council, and many outside educational researchers, has agreed upon several major areas of focus. These can be characterized as major social or cultural problems that will be studied through educational research and development. A more complete statement on each of these areas will be forthcoming from the Bureau in the next two or three months.

The Bureau, its colleagues in Government, and its advisers have identified vocational occupational education as an area of high priority.

We are still saddled with high dropout rates from secondary schools, particularly urban schools pointing up the serious need for both relevant vocational offerings and the creation of career ladders which offer continuing learning opportunities. Rapid growth of community colleges, technical institutes, and area vocational schools has opened many opportunities in training for expanding technical occupations. Now, I would like to break down this priority area into the five or six sub-areas which have guided the activities and investments of my Division over the last four years.

These sub-areas, of course, have been modified and adapted to the discoveries and results of research sponsored during this four year period. It is our expectation t h a t e v e n t h e s e areas of specific emphasis will be substantially modified and overhauled during 1970 in line with a further Bureau-wide priority setting effort to be undertaken in fiscal year 1970. It is my hope that in sharing with you these current priorities, you will have an opportunity during the remainder of the conference to comment upon and make suggestions for modifications in these guidelines.

As you know, a large share of the research effort in DCVER has been the support of individual research and development projects. Approximately 80 percent of the over \$60 million spent on occupational education research and development activities during the last four years has been invested in individual studies and projects. During this time, some six areas of emphasis have characterized the scope of the vocational education research program as authorized under section 4(c) of the Vocational Education Act of 1963. These six areas of priority emphasis are: (1) Program Evaluation, (2) Vocational Curriculum Improvement, (3) Vocational Education Resource Development, (4) Vocational Guidance and Career Choice Processes, (5) Organizational and Administrative Practices, and (6) New Careers.

Program Evaluation--An important responsibility of a number of Federal agencies is in assisting vocational education to become more effectively aligned with the emerging job opportunities in this country. To ensure that our human resources are optimally developed and matched with emerging and continuing employment opportunities, requires the continuing evaluation of our educational output. Particular emphasis will be placed upon individual projects which are designed to establish appropriate procedures for adapting job projections and survey information to the planning requirements of local schools. Where valid evaluation procedures and costs effectiveness techniques have not been fully developed, we will finance research projects designed to develop improved yardsticks and measurement instruments. DCVER will also assist in the dissemination of procedures by which new and innovative approaches to vocational education are evaluated and transformed into educational practice. Procedures for planning and implementing state and local programs will also be supported to strengthen state planning capabilities.

Vocational Education Curriculum--The need for substantial improvement in both existing and new vocational education curriculum materials has been evident. A curriculum which serves to integrate basic learning skills and knowledge and skills can be combined in ways that will readily

adapt to the individual learning styles and interest of students. Vocational curriculum should be so designed that students who graduate from a vocational program at the end of high school or post-secondary school are qualified to enter into a cluster of occupations or exercise the option to continue their education at a college or adult level. The curriculum should ensure that such graduates are able to function not only as workers but as citizens and parents in a free enterprise economy.

Hopefully, much of the curriculum improvement projects supported through Federal funds would be oriented towards the specifications of performance objectives, so that students could be assessed on their ability to perform at a minimally acceptable level upon completion of a given course of study. Such a procedure should help to provide an opportunity for empirical validation of the teaching effectiveness of a given vocational program.

Vocational Education Resource Development--The rapid expansion of service industries, particularly in the urban setting, the increased emphasis upon post-secondary vocational and technical education, and the proliferation of new area vocational schools and community colleges has put increasing emphasis upon the demand for vocational and technical personnel. Such resources as teachers, appropriate instructional equipment and soft ware, and even school facilities and equipment, need to be acquired and adapted to the needs and interest of students from a wide variety of backgrounds and environments. Studies are needed that will identify the numbers, qualifications, and sources of staff personnel to fill the projected needs of an expanding vocational program. Moreover, research is needed to determine what vocational teachers require in the way of new skills and insights to function within a more individually oriented and student-centered curriculum. The recognition that vocational educational programs must have a different format and orientation for urban schools is a concern of the highest priority. How to make vocational programs attractive and adaptable to the various learning capabilities of disadvantaged students has been and will continue to be a major area of emphasis for DCVER.

Vocational Guidance and Career Choice Processes--Learning to make appropriate career decisions is an important part of every students educational experience. To assist vocational guidance counselors and the individual himself prepare for his role as an adult and to help him grow both as an individual and as a member of various groups, continuing research is needed on how concepts of work are formed, how individuals become motivated to pursue a given career, and what satisfactions are derived as one moves through his working career. Additional information is needed on the relationship of family backgrounds, peer group associations, previous work experience, and attitudes towards self to occupational decisions and commitments. More attention needs to be given to the career patterns of women and to members of minority groups.

Organization and Administration--Considerable attention must be directed to the improvement of existing organizational structures for vocational education at state and local levels. The identification of factors which influence change and priority alignments among state programs for

vocational education need to be carried out. The role of state boards, advisory groups, and other important determiners of vocational education policies should be studied. Successful local, state, and regional programs and related organizational structures need to be identified. Recent developments in ungraded programs, team teaching, flexible scheduling, and individualized instruction need to be related and adapted to the purposes of vocational education.

New Careers--The Vocational Education Act of 1963 emphasized the need to develop vocational-technical education programs geared realistically and flexibly to current and anticipated employment opportunities, and to individual needs, interests, and abilities. One major approach to meeting this need is to expand opportunities for training for careers in fast-growing human service activities. High and persistent unemployment and underemployment of the disadvantaged is incongruous in the face of our nation's urgent requirements for trained personnel to provide more and better education, health, welfare and other services.

To help improve the development of our human resources, the Division of Comprehensive and Vocational Education Research, has actively supported research designed to establish innovative vocational-technical education programs for new careers in the human services. Activities have included stimulation of interest in the potential of research for curriculum design and development in these expanding fields, provision of technical assistance, and financial support for such research.

Underlying these projects is the basic assumption that well-designed new career programs will alleviate acute shortages of professional manpower, provide useful jobs with career possibilities for large numbers of disadvantaged and other unemployed persons, and help improve the delivery of health, education, welfare, and other services to the community.

In general, these projects are all designed to (1) use job analysis techniques to identify the nature and scope of job tasks and physical, mental, and interpersonal job skills; (2) organize tasks and skills into a career sequence or hierarchy of jobs with increasing responsibility and pay; and (3) develop articulated secondary, post-secondary, and higher education programs which will qualify students and workers for subprofessional level jobs and for advancement commensurate with their ability, education, and experience.

Let me now attempt in my few remaining minutes to describe the end product or expected output of the research effort stemming from our efforts in behalf of these priority areas. This is a dangerous undertaking because no one is absolutely sure what the end product will be. It's an exciting venture, at any rate. Here, then, is one man's view of a prototype school of the 70's.

It will be a learning center, flexible in construction, in curriculum and in schedule. Schools will open from early in the morning--perhaps 7:00 a.m.--until 10:00 or 11:00 at night 12 months a year. The programs of individual students, and their learning schedules, will be suited to

their needs. Thus a student may be working part-time but will have his education--his classes, lectures and self-study commitments--organized in such a way that it will not conflict with his job.

It goes further: a student's job and his classes will be coordinated. His formal education will carry him outside the school building part of the time so that "real-life" experiences can sharpen his sense of the relationship between himself and his community. Learning in the '70's will no longer be considered exclusively academic; all work performed by the student which helps him master new skills and develop his potentialities, as well as all work which prepares him to assume an adult role in his community, will be considered part of his education. In the school building itself, space will be allocated to various trades and industries and instruction will be given by men and women who are technical experts in their field, but who in addition have been certified as special teacher-aides. In some communities, such classes may actually be held at the industrial plant itself.

In weaving together academic and vocational education, the school of the 70's uses practical matters as a way of providing insight into material that a substantial number of high school students would otherwise consider irrelevant. The occupational goals of young people, their desire for economic self-sufficiency, and their involvement with particular vocational activities, can provide the motivation for achievement in related subjects such as science and mathematics.

The schools of the 70's are a product of the awareness that an educational system must contribute to the nation's well-being on three levels; economic, political, and social. Without an informed public, it is difficult to see how complex political issues can be presented to the voters with any hope of obtaining an intelligent consensus. On the social level, it is almost certain that the only approach to a well-ordered democratic society lies in the ability of people to get along with each other, fully respecting each other's uniqueness. But these issues cannot be taught in the abstract to students whose primary concern is getting a job when they graduate. It must work the other way around; by beginning with the student's own concern--a job--an educational system can be developed which will also teach him the things he must know (such as English, for example, or the social sciences) in order to be a useful member of his community.

Each student will pursue his studies at his own pace or in groups by making use of a wide range of new instructional techniques: audiovisual aids, self-study systems, programmed instruction and other self-pacing devices, educational television (closed circuit and public broadcast), computer-managed instruction, single concept films, communication-linked study centers, testing machines and many other instruments. While students may often be studying alone, there will be specific periods set aside for them to meet as a group with teams of teachers who will help with tasks that have posed troublesome problems. At the same time older students from more advanced classes will be encouraged to join these groups as tutors so that they can pass along what they have already learned. This serves a double purpose: younger students gain by being taught--and older ones gain by teaching. In addition, credit for social service will be earned by the tutors, thus reinforcing the schools of the 70's emphasis on the human dimension in education.

A student's standing at any given moment will simply reflect a realistic evaluation of the quality of work he has done up to that point: the level of skill that he has shown and the body of knowledge that he has absorbed. Although the competitive spirit will endure, it will express the student's search for ways in which he is superior--but his success will not be measured by how his performance compares with that of other students. Teachers in the 70's will evaluate a student in relation only to himself as he strives to achieve goals that he has selected with the help of the school staff. By periodically checking present accomplishments against those of the past, teachers gain a progress index which then becomes the basis for defining the next quota of work and, where indicated, a possible upgrading of future aspirations.

To increase the individualized nature of any particular course of study, examinations will be available upon request at any time. If a student has finished a series of assigned work problems and believes that he has mastered all the necessary skills, he can go to the achievement center where he can ask for an evaluation of his progress. On the basis of that evaluation, he may proceed to the next stage of study. The examination will take place in a special school unit and will utilize electronic scoring devices, leaving those sections that cannot be scanned by machines to be examined and rated by special examiners. One advantage of this method is that these examiners will be able to establish and maintain essentially objective and consistent standards of judgment.

Since students in this new type of learning center will not be given passing or failing grades at the end of the year, there will be periodic evaluations of the individual's rate of progress. He will confer with counselor-teachers who are prepared with a complete and up-to-date record of his accomplishments made available through computers. At intervals throughout the year, each of the student's teachers will record on tape his subjective impression of the student's abilities and attitudes. These will be filed as part of his master-profile. On the same tape will appear evaluations of his learning progress. These observations will be available to parents, who in addition will automatically receive periodic printed reports.

As part of the new approach to education in the '70's, schools will develop a greater emphasis on improving interpersonal skills. As our population, like that of the rest of the world, expands astronomically, the individual increasingly feels lost in the crowd. Secondary schools in the 70's will have to take steps to reaffirm the American belief that the individual counts, that his progress is noted, and that others care about what happens to his life. This can hardly be communicated more effectively than in a close working relationship between students and teachers.

In closing, I would like to quote from a recent book by George Leonard called Education and Ecstasy. Mr. Leonard, a senior editor for Look magazine, has written, in my view, a first-rate statement on what is wrong with education and where it might go if given the opportunity. His imaginary treatment of the classroom in the future sets a new target for those of us who are concerned with innovation.

He says:

All that goes on in most schools and colleges today is only a thin slice . . . of what education can become Already, the seeds of a real change are germinating--on college campuses, in teachers' associations, in laboratories of science, in out-of-the-way places This reform would bypass entirely the patchwork remedial measures . . . that presently pass for reform. It cuts straight to the heart of the educational enterprise, in and out of school, seeking new method, content, idiom, domain, purpose and, indeed, a new definition of education. Far from decrying and opposing an onrushing technology, it sees technology as an ally, a force that can as easily enhance as diminish the human spirit. Avoiding hard-and-fast assumptions of its own, it is rigorous in questioning some of the automatic assumptions of the past. It is (indeed) a new journey.

Footnotes

1. Journal of Industrial Teacher Education, Special issue on Research Policies for Vocational and Practical Arts Education, Fall Issue, 1968, Vol. 6, No. 1.
2. House Report No. 1647, Supplemental Views on H.R. 18366, Government Printing Office, 1968, pp. 2-3.

MANPOWER NEEDS, NATIONAL GOALS, AND RESEARCH PRIORITIES
IN VOCATIONAL-TECHNICAL EDUCATION

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I

The 1968 Vocational Act Amendments are symptomatic of a growing national concern with priorities in vocational-technical education. This concern is evident in the increase in Federal support authorized for vocational education. It is apparent in the emphasis in the Amendments on serving the needs of persons in the economically and socially disadvantaged groups in our society. The interest in a reordering of priorities is underscored by the repeated references in the Amendments to the need for more and more effective planning to relate state and local vocational education programs to the anticipated manpower requirements and job opportunities at the national, state, and local levels. Implementing this shift in priorities will involve a search for new research strategies in vocational education.

There has been considerable controversy in the past decade concerning the role, the adequacy, and the objectives of vocational education. Much of this questioning arises from changes in the larger society and from the need to define responses by the educational system to these changes. The forces making for change in vocational education are the same forces which have been influencing national social policy in many areas in the past ten years. They involve the growing backlog of unmet needs of many kinds in virtually every large city in the United States, along with the problems created by the undesirable byproducts of technological and economic advance such as air pollution and suburban sprawl. As we become a better educated and more affluent nation, we demand more services to narrow the gap between the potentialities of modern technology, medical technology for example, and the actual level of services available to most Americans. We become less willing to tolerate the continued existence of islands of poverty and unemployment in the world's most productive and prosperous economy. To cite an instance, most of us are appalled by the statistic indicating that in the high prosperity year 1967, between a fifth and a third of the non-white teenagers in our country were unemployed.¹

These and similar changes are responsible for a far-reaching search for greater relevance in education. The search for relevance is the motive force in the 1968 Amendments, as it was in the enactment of the Elementary and Secondary Education Act a few years ago and in the establishment of programs such as Project Head Start. This keen interest in relevance in vocational education shows up in the legislative stipulations spelling out the uses of the federal funds. Up to 25 percent of the funds to be allotted to the individual states, according to the Amendments, are to be used for programs aimed at benefiting the economically, socially, and culturally disadvantaged.

If "relevance" and "priorities" are to become the basis for planning in vocational education, what does this mean at the level at which most program decisions are made, the state and local levels? Relevance in this kind of planning clearly means assigning a considerably greater weight in program planning to future career opportunities and manpower needs. But what are the research strategies which can enable us to translate manpower information into vocational programs? What do we know, and what are the gaps in our knowledge in making this translation?

These are difficult questions and, as an economist, I don't pretend to have the answers. But searching for better answers will involve building a bridge between the producers of manpower information, the economists, on the one hand, and the consumers of this information, among whom researchers and decision-makers in vocational education are a strategic group. Once the two groups begin to cross this bridge and initiate a dialogue, more and better answers will be forthcoming.

The educator searching for information about future manpower needs is likely to encounter a mountain, and sometimes a jungle, of estimates indicating projected requirements and job openings for cooks, nurses' aides, truck drivers, nuclear technicians, and others. This mountain of information requires a map if it is to make sense. To appraise the information, the user needs a framework relating the projections to their purpose, their uses, and their limitations.

As an initial guide to the use of manpower projections, I would suggest an aphorism attributed to the American philosopher, Whitehead. It reads something like this: "Seek simplicity, but mistrust it." I would rephrase Whitehead's aphorism to read: "Seek manpower projections, but use them with caution." Manpower projections, like other economic projections, can be useful in indicating strategic areas of change to be taken into account or the implications of alternative developments for the economy for manpower utilization such as the effects of either an increase or a decrease in defense expenditures in the coming decade. However, we are many lightyears away in the social sciences from being able to predict the future 5, 10, or 15 years from now. This is true for manpower needs, and it is also true for stock prices.

The phrase "change agent" is often found in the literature dealing with planning in education. I am not sure I know what a change agent is. However, a new way of approaching a problem, a fresh perspective, can be a potent instrument for change. I propose to suggest such a perspective as a framework for organizing information about future manpower needs and their implications for vocational-technical education. This perspective is concerned with the impact of the pursuit of national goals for manpower needs and for education.

II

Terms such as "goals" are sometimes taken to refer to abstract purposes divorced from everyday practice. A sales clerk who sells cereal to a housewife, a teacher who instructs a class, a doctor who treats a patient, a businessman who decides to build a factory -

all would be astonished to be told that they were engaged in the pursuit of national goals, namely, increasing the standard of living, promoting education and health, and increasing the economic strength of the country. They would be as astonished as the man who was told that he had been talking prose all his life.

Yet pursuit of the nation's goals can significantly affect manpower requirements and job opportunities in many occupations. The impact of Medicare and Medicaid in enlarging needs in the health occupations or the role of the space program in the early 1960's in increasing requirements for engineers, scientists, and technicians offer recent and sometimes striking illustrations.

The organization I am affiliated with, the National Planning Association, has been engaged in a sustained program of research for over five years to indicate the dollar costs and manpower requirements for achieving an illustrative series of national goals in sixteen areas embracing virtually all aspects of the private and public economy.² These goals include education, health, research and development, social welfare, urban development, and many other areas. The dollar costs for the goals considered and the manpower needs associated with them are described in the Appendix.

The nation's choice of priorities has many implications for research strategies in vocational education because the kinds of career opportunities available in the next decade will be substantially affected by our society's needs and aspirations, and by what we do, individually and collectively as a nation, to implement our goals. To cite an instance, the rapidly growing areas of employment opportunity are the professional, technical, and the service occupations. About half of all the employment growth in the next 10 years is expected to take place in the three occupational areas. These career opportunities will largely grow out of the pursuit of three goals - health, education, and research and development. Similarly, the extent to which job opportunities expand in the building trades in the 1970's will depend, to a large extent, on the pace at which the nation moves to implement priorities in rebuilding cities. According to NPA's goals studies, achieving goals in urban development in the mid-1970's could create jobs for as many as 10 million persons who would be employed in virtually every occupation listed in the census statistics.

To bring out these consequences of pursuit of national goals, Table 1 indicates the estimated manpower needs in the 1970's per billion dollars of expenditure for health and education, considered for this purpose as one goal, and for urban development.

If our nation were to assign a high priority to objectives in health and education, most of the job openings created would be for professional workers, such as doctors, teachers, and nurses, for technical workers, e.g., medical technicians, and for service workers. Many of these jobs would represent employment in state and local government agencies since state and local governments provide most of the public services in the two areas. Much of the employment for service workers would be in established fields. Hospital attendants or cooks are illustrations. Employment would also grow rapidly in the

Table 1

Estimated Manpower Requirements per Billion Dollars
of Expenditure in 1975 for Selected Goals¹
Number of Employed (in 000's)

<u>Occupational Category</u>	<u>Health & Education Goal</u>	<u>Urban Development Goal</u>
White Collar Workers	64.0	34.7
Professional and Technical	45.5	8.5
Managers and Self-employed	2.5	10.3
Clerical	13.3	12.2
Sales	2.7	3.7
Blue Collar Workers	15.8	53.7
Craftsmen and Foremen	6.9	27.4
Operatives	7.2	17.7
Laborers	1.7	8.6
Service Occupations	22.4	3.7
Farm Occupations	0.7	1.1
Total	102.9	93.2

¹ Refers to final demand expenditures in 1962 prices.

newly emerging human service paraprofessional occupations, such as nurses'aides, teachers' aides, or neighborhood workers. These human service occupations are so new that they do not figure as yet in the census occupational statistics, the basic sources for manpower information. While increases in employment of 100 percent or more are anticipated in many of the paraprofessional occupations, the vocational-technical education system is just beginning to introduce programs preparing young persons for careers in these fields.

Shortages of professional workers, together with expansion of services, are likely to create many openings for service and technical workers in health and education in the next 10 or 15 years. In a study NPA is undertaking for the United States Office of Education, we have estimated that if the nation assigns a high priority to goals in health in the 1970's, a reasonable assumption in the light of the experience of the 1960's, there would be career openings for an estimated 2.3 million workers performing direct health services as nonprofessional technicians, subprofessional assistants, and nonprofessional aides.³ All told, enrollment in vocational education programs in the health occupations amounted to nearly 84,000 in fiscal year 1966. This figure represents an increase of over 40 percent beyond the 1964. Yet the 1966 enrollment amounted to a little more than 1 percent, 1.4 percent, of all enrollments in vocational education programs in that year.⁴ The annual completions of vocation education programs, as indicated by the preliminary 1967 figures, amounted to as much as three-tenths of the estimated annual average number of career openings in the coming

decade in only two of the health occupations, practical nurses and dental assistants.

Over half of the job openings in urban developments, 54 percent, are expected to represent opportunities for blue collar workers, primarily skilled craftsmen and semi-skilled operatives. These include many occupations for which vocational preparation is already offered through the vocational education system for high school students and young adults. Given the nation's commitment to rebuilding our cities through public and private programs of many kinds and the anticipated growth in population and economic activity, "there is every indication," according to the President's Council of Economic Advisors in their 1969 Report, "that the demand for construction in the 1970's will be of unprecedented magnitude."⁵ Discussing the legislation enacted by Congress in 1968 to encourage construction of 6 million housing units for low income families, the Council adds that "success in meeting the national target for housing recently adopted by the Congress will depend upon the availability of enough skilled workers."⁶ In the light of this outlook for workers in the construction trades, it is apparent that the research strategies to develop state and local vocational education systems which are responsive to manpower needs in the 1970's will be the strategies aimed at increasing enrollment in the programs related to construction to at least as high a figure, for example, as the enrollment in fields related to agriculture.

III

Since manpower needs for the different goals vary widely, the educational needs they imply also differ markedly. Pursuit of some goals would largely create job opportunities for persons with a high school education, or even for school dropouts. Concentration on other goals would mean many more career openings for graduates of junior colleges and of four-year colleges and universities. These differentials are illustrated in Table 2, again with reference to urban development and to health and education considered as a single goal.

Table 2

Estimated Distribution of Employment by Level of Educational Attainment in 1975 for Selected Goals

<u>Years of Schooling Completed</u>	<u>Percent Distribution of Employment</u>	
	Health and Education Goal	Urban Dev. Goal
Less than 4 years of high school	26.0 %	43.0 %
4 years of high school	29.0	35.5
1-3 years of college	14.5	12.0
4 years of college or more	30.5	9.5
Total	100.0 %	100.0 %

About four-fifths of the job openings created by urban development programs would represent openings for persons with a high school education or less. Over two-fifths of these openings would be made up of jobs which are frequently held by "dropouts," that is, by persons with less than four years of high school. The vocational education planning to prepare persons for jobs associated with urban development would be concentrated on high school programs and on special programs for out-of-school adults who did not complete high school. While a larger percentage of the young people entering the labor force in the 1970's than in the 1960's will be high school or college graduates, it would be unreasonable to expect that virtually all persons reaching maturity in the next decade will have completed at least four years of high school. In addition, the educational level of the older workers will be considerably less than that of the new entrants into the workforce. Expanding programs related to construction for persons who were no longer full-time students would actively involve the vocational education system in helping to cope with the problems of two of the major "left out" groups in the central cities - the frequently unemployed and socially disorganized teenage dropouts, and the older workers who were deprived of educational opportunity in their youth.

While many of the job openings for the health and education goals also involve programs in the high schools or special programs for adults, almost half of the job openings in these fields, 45 percent, can be expected to involve higher education as the typical educational requirement. The planning for many of these job openings would be concentrated on introducing or expanding junior college vocational programs for subprofessional and technical workers such as teachers' assistants or medical technicians. Much of the planning to meet manpower needs in health and education would be concerned with preparing teachers, doctors, and similar professionals in four-year colleges and universities. Concentration on health and education would create over three times more job openings for these college graduates than a comparable concentration on urban development priorities.

IV

More than ever before in American history, national policy is committed to creating more and better employment opportunities for persons in the economically and socially disadvantaged groups in American society. Expanding and upgrading job opportunities for individuals in these groups through education and job training has become a strategic ingredient in our programs for coping with poverty and racial discrimination. In a society such as our own in which education and training, occupation, income, and social status are so closely related to one another, state and local planning in vocational education becomes an important dimension of the overall planning to upgrade the income and status of persons in the "left out" groups in the nation.

The potentials for planning vocational education programs concerned with career openings for the economically and socially disadvantaged created by the pursuit of national goals are illustrated by the projections in Table 3. The table indicates the estimated

employment opportunities for non-whites in the 1970's generated by a billion dollars of expenditure for the goals considered in the earlier tables, health and education, and urban development.

Table 3

Estimated Employment for Non-whites per Billion Dollars of Expenditures in 1975 for Selected Goals¹

<u>Occupational Category</u>	<u>Number Employed (in 000's)</u>	
	<u>Health and Education</u> Goal	<u>Urban Development</u> Goal
White Collar Workers	5.1	1.8
Professional and Technical	4.0	0.4
Managers and Self-employed	0.1	0.3
Clerical	0.9	0.9
Sales	0.1	0.2
Blue Collar Workers	2.1	7.3
Craftsmen and Foremen	0.6	2.6
Operatives	1.1	2.6
Laborers	0.4	2.1
Service Occupations	6.1	0.9
Farm Occupations	0.1	0.1
Total	13.4	10.1

¹ Refers to final demand expenditures in 1962 prices.

A high priority for programs in health and education would create more jobs for Negroes and other non-whites than a similar priority on other goals such as urban development. Many of these positions would be in professional and technical occupations in which non-whites already are relatively well represented. Elementary school teachers and medical technicians are instances. Even more job opportunities would become available for non-whites in service occupations, such as practical nurses or teachers' aides, for which training can be provided in the high schools, special adult courses, or community colleges. Planning to introduce and expand vocational programs in health and education both serves community demands for more health and educational services and it generates substantial numbers of job openings for persons in the "left out" groups in America.

Concentrating on objectives in urban development would create fewer job openings for non-whites for each billion dollars spent than in health and education. However, many of these job openings would represent opportunities in skilled and semi-skilled blue collar occupations as craftsmen and operatives in fields related to construction. At present, non-whites are heavily underrepresented in many of the more

skilled building trades such as electricians or plumbers. If non-white males had been employed in these crafts in the mid-1960's in the same proportion they made up of the total male civilian labor force (10 percent), there would have been 32,000 more non-white carpenters, 31,000 more electricians, and 15,500 more plumbers and pipefitters.⁷ It will be difficult to meet the large increases in many of the skilled building trades which would be generated by high priority programs for rebuilding cities in the 1970's unless substantially more opportunities are created for Negroes and Puerto Ricans to gain admission to the education and training programs and to the unions, which are typically the prerequisites for entering these occupations in the urban centers. Again, the vocational education system can anticipate manpower needs and serve young persons in the economically and socially disadvantaged groups by expanding and upgrading its trade and industry and technical programs in the large cities to reach many more young persons, white and non-white, from low-income backgrounds.

V

This recital of the relationship between manpower needs, national goals, and priorities in vocational-technical education raises a series of questions for state and local planners. Will the one-year and five-year plans required by the 1968 Amendments assign sufficient weight to the manpower needs generated by the greater demands for services and facilities in an urbanized society? Will the vocational schools in the central cities be among the best in each state or will they continue, in many cases, to serve as dumping grounds for students who are ill-served by the present more academic curricula in other types of programs? Will the vocational programs in rural areas be responsive to the occupational needs of the cities which will provide employment for the large numbers of young people who migrate to the cities after completing their education in rural areas or in small towns?

Planners who seek to use manpower projections as an aide in determining priorities in vocational education encounter a series of problems. Most of the program planning is done at the state and local level. Most of the manpower projections provide data on a national basis. Similarly, manpower projections generally provide indications of employment growth. Yet the number of career openings in any field in the coming decade will include both the opportunities arising from employment growth plus those created by the need to replace attrition losses. These problems require further consideration if manpower projections are to be used effectively in developing state and local vocational programs.

The current occupational projections are generally available only on a national basis because the basic information required to prepare them is largely generated on a national basis, usually from census sources. Since the industrial structure of the individual states often differs markedly from the national pattern, career opportunities in individual states may also diverge markedly. The projections which are relevant for centers of manufacturing activity such as Michigan or Pennsylvania would differ significantly from the projections which were useful for agricultural states such as Iowa or for areas dominated

by white collar employment such as the District of Columbia. Each, in turn, would vary from the national pattern. National projections, accordingly, offer little more than a point of departure for planning vocational education programs on a state and local basis, and in many instances they would be misleading.

Development of state and local area manpower projections constitutes a high-priority need if more effective research strategies are to be devised in vocational education. The 1968 Amendments recognize this need and they provide for support to the U. S. Department of Labor to prepare these projections. But it is likely to be some time before a suitable methodology is adopted and the information is generally available. Once the information is available, some knowledge of the problems encountered in preparing these projections is needed to provide guidelines indicating their uses and limitations.

There are no easy answers to the problem of developing state and local projections. School districts and states are political and administrative rather than economic units. Many of the people who live in New Jersey, Connecticut, or Long Island, for example, work in New York City. Therefore, the state plans for New Jersey and Connecticut and the local vocational plans in Long Island should allow for the future job openings in New York City as well as in their own areas.

An economist discussing an abstruse highly mathematical theory which he disliked commented that "It is better to be vaguely right than precisely wrong." To disregard state and local differences from the national projections or to ignore labor markets which transcend state and local boundaries is often to be precisely wrong. To take them into account, allowing for our very imperfect knowledge, will often help vocational education planners to be vaguely right in their plans, and, hopefully, even better.

The available techniques for preparing state and local manpower projections cover a broad range. At one extreme, they are based on highly sophisticated input-output models indicating the industrial structure of an area and showing its relationship to other areas in the nation. These input-output models provide the most comprehensive and probably the most reliable basis for projecting manpower needs in an area.

While input-output models are beginning to be developed for many metropolitan areas and for some states, they are complex and costly to prepare. Where systematic information of this type is not at hand, which is usually the case currently, less elaborate methods involving heavy use of informed judgments can often help planners in being vaguely right. Some of these methods are based on the reports of job vacancies prepared by the United States Employment Service. Others rely on techniques of interrogation of panels of knowledgeable persons to determine the consensus of judgment or the range of opinion about an uncertain future event. One of the best known of these methods is a technique devised originally by the RAND Corporation for the U. S. Air Force and appropriately known as the Delphi method.

A Delphi-type panel for developing state manpower projections might consist of local businessmen, union officials, educators, economists, and others. They would be given background data on the economy of the state as it compared with the national economy. For each occupation considered, the panel members would be asked to estimate whether its growth, say in the next 10 years, was likely to approximate, exceed, or fall short of the national projection, and by how much. The individual members would be asked to state their answers and the reasons for them. In successive rounds of questioning, usually by mail, the panelists would be asked to reconsider their answers in the light of the reasons given by the others. In this way, a series of judgmental estimates could be developed which would translate the national projections into comparable state and local estimates.

Most manpower projections are incomplete for an additional reason. Typically they refer to the employment growth in an occupation over a period of time. Vocational planners are interested in career openings, and these openings are caused by attrition losses as well as by employment growth. In occupations which are growing slowly, and especially if there are many older workers in the field, replacement needs in the next decade will frequently exceed the employment growth. Printing craftsmen can serve as an example. In our own projections, employment growth for printing craftsmen is expected to be less than 3 percent, a growth of 8,000 in the 1965-1975 period. Job openings for printing craftsmen because of replacement needs are expected to reach as high as 82,000 in this same period.⁸ At present, we do not have adequate estimates of the attrition losses in most non-professional occupations. Until this data is available, a rough approximation which can be useful in vocational education planning is to utilize the information which is available by age group and sex for the entire labor force as a proxy for the attrition losses by age group and sex in individual occupations. The age and sex distributions for specific occupations is published by the Census.

Emphasis on the gaps in our manpower information diminishes the certainty with which we can plan rather than diminishing the need for planning. The large role assigned in the 1968 Amendments to relating vocational education programs to the anticipated manpower needs presents an opportunity and a challenge. The challenge and the opportunity are to make vocational education more relevant in the society in which technology, needs, aspirations, and career opportunities are rapidly undergoing change. The research strategies which will be significant in the next 10 years are those which are concerned with the impacts of these changes for priorities in planning programs in vocational-technical education.

Footnotes

- (1) Manpower Report of the President, 1968, Table A-13, p. 237.
- (2) Lecht, Leonard A., Goals, Priorities, and Dollars - The Next Decade, The Free Press, 1966; and Manpower Needs for National Goals in the 1970's, Praeger, 1969.
- (3) Teeple, John, Implications of Career Openings in Health Occupations for Priorities in Vocational-Technical Education, Working Paper prepared by National Planning Association for the U. S. Office of Education, October, 1968.
- (4) "General Report of the Advisory Council on Vocational Education, 1968," in Notes and Working Papers Concerning the Administration of Programs Authorized Under Vocational Education Act of 1963, U. S. Senate, Subcommittee on Education, Committee on Labor and Public Welfare, 1968, p. 105.
- (5) Annual Report of the Council of Economic Advisors, 1969, January, 1969, p. 104.
- (6) Ibid., p. 105.
- (7) Manpower Needs for National Goals, op. cit., p. 99.
- (8) Manpower Needs for National Goals, op. cit., p. 35.

Appendix Table 1

Expenditures for Individual Goals, 1962, and 1975*
(in millions of 1964 dollars)

Goal Area	Expenditures in 1962	Projected Expenditures for Aspiration Goals in 1975	% Increase in Expenditures 1962 to 1975 ^b
Agriculture	\$ 7,300	\$ 9,300	26%
Area Redevelopment	400	1,000	186
Consumer Expenditures	364,800	674,400	85
Education	31,200	86,000	176
Health	34,000	89,800	164
Housing	30,900	65,000	111
International Aid	5,500	12,500	126
Manpower Retraining	100	3,100	(a)
National Defense	53,800	70,700	32
Natural Resources	6,000	17,100	183
Private Plant and Equipment	50,100	155,000	209
Research and Development	17,300	40,000	131
Social Welfare	39,100	94,400	142
Space	3,400	9,500	181
Transportation	35,900	76,600	113
Urban Development	67,700	136,700	102
Gross Total	\$747,400	\$1,541,100	--
Minus Double Counting and Transfer Adjustments	174,100	379,600	--
Net Cost of Goals	\$573,300	\$1,161,600	103%

* Source: Lecht, Leonard A., Goals, Priorities, and Dollars -- The Next Decade, The Free Press, 1966, Table 1-2. The estimates in this source are in 1962 dollars. They are expressed in 1964 dollars in Appendix Table 1.

- (a) Since the Federal retraining programs were just getting underway in 1962, a percentage increase computed from 1962 as the base would be misleading.
- (b) The expenditures listed in the table have been rounded. The percentage increases refer to the unrounded totals.

Appendix Table 2

Estimated Manpower Requirements for Individual Goals in 1962,
and for Aspiration Goals in 1975

<u>Goal</u>	<u>Manpower Requirements (in 000)</u>		<u>% Increase in Requirements, 1962 to 1975</u>
	<u>1962</u>	<u>1975</u>	
Consumer Expenditures	42,489	58,649	38%
Health and Education	9,069	17,140	89
Housing	3,425	5,422	58
International Aid	509	812	60
National Defense ^(a)	3,457	3,264	-6
Natural Resources	652	1,201	84
Private Plant and Equipment	5,586	11,250	101
Research and Development ^(b)	2,259	4,295	90
Social Welfare	4,593	8,395	83
Transportation	3,961	5,972	51
Urban Development	6,336	10,160	60
Minus double counting and transfer adjustments ^(c)	14,490	25,354	--
Net total, all goals	67,846	101,206	44

(a) Refers to employment generated in industry because of purchases of goods and services for national defense. This includes government employment in industrial sectors for which there are counterparts in the private economy, i.e., in shipyards, ordinance plants, transportation, etc. The estimates exclude government employment corresponding to the Census category, "public administration." The armed forces are also excluded. They are projected to decline from 2.8 million in 1962, and 3.1 million in 1966, to 2.4 million by 1975.

(b) Includes space research and development.

(c) Includes persons who are counted as part of the manpower requirements for more than one goal, and persons whose employment is unrelated to pursuit of the goals listed.

STRATEGIES AND RESPONSIBILITIES TO MEET THE REQUIREMENTS
OF THE VOCATIONAL EDUCATION AMENDMENTS OF 1968 (P.L. 90-576)
FOR SHORT-TERM AND LONG-RANGE NEEDS

George L. Brandon
Professor in Residence and Advisor to the Executive Director
American Vocational Association

Opportunity for Strategy in the National Research Conference

A great deal more than a commendatory nod is due to the fine efforts of our colleagues at Oklahoma State University and in the Division of Vocational and Technical Education of the U.S. Office of Education for staging this conference. Surely this cooperation has given us the setting for an important, opportune, give-and-take meeting which only stands to have violence committed to it by a bevy of speakers, each of whom will be formulating "strategies" for the vocational and technical research enterprise of the days ahead. Perhaps this notion of the "strategical" conference implies that the speakers are supplying the "strategy" and the audience or participants will provide the "tactics." It should be an interesting delegation of labor; may heaven help the conference evaluators. To skip all of my innuendos about strategy versus tactics in our conference theme, there is a very real place for both in our research problems these days. Somehow it seems to begin and end in the communication process which should embrace all of us and our varied interests and concerns. And more than a small measure of faith must be brought to our deliberation--at least the faith that all of us hold for the educational process, the greatness of America (with all of its disparagement these days), and our own capability.

I should confess the temptation to do violence to the topic of my presentation. Personally, I should prefer to stick to the meaning and professional obligations of the new vocational legislation, and leave the strategies to the general product and combined wisdom of this conference. Consequently, the revision of the topic to read, "Professional Undertaking and Implementation of Research in VEA 68" would be much more to my liking, and possibly more palatable to you.

In participating in this conference, you could conceivably represent one of approximately 25 to 30 groups of one sort or another. I do not wish to imply that your interest (and that of the group you represent) is alien to the central purpose--vocational and technical education--of the conference. I do wish to make each of you sensitive, however, to the conglomerate personnel makeup of this meeting. In facing up to this conglomerate I realize that I am shooting for the impossible in finding common ground with each of you and in taking off from there to zero-in on our reasons for being here. The statement of this challenge is probably more accurate if placed in another context--that is, that an understanding of research in vocational and technical education is greatly dependent upon an understanding of vocational and technical education to begin with. I do not exclude from this assumption the understanding of those persons in the educational profession--vocational, general or otherwise.

The 90th Congress has packaged a new lease on life for those citizens of our country who need vocational education. In this presentation I may use the term "VEA 68," "the new bill," "Public Law 90-576" synonymously. Many of you had a hand in supporting the new provisions and in enlisting the backing of your friends. I should, indeed, be remiss if I failed to commend you on behalf of the prime mover, the American Vocational Association, our professional organization in vocational and technical education. My enthusiasm for the pride of accomplishment of the AVA should not be interpreted as an official endorsement of my presentation by the AVA--it doesn't, and I do not expect it to.

My basic, personal objective in this presentation, therefore, is professional and informational. I shall be delighted if I can, in even a small way, to help set the stage for several days of free-wheeling discussion (and hopefully some well coordinated follow-up) in relating vocational and technical education research to the intent, purpose, and implementation of the new legislation.

The General Tune of the Times

Our present social condition is well known to you in your individual walks of life. It is full of imbalances, disparities and sad commentaries which are seemingly impossible to reconcile with a fat economy, a trillion-dollar GNP, and record setting rates of unemployment. Possibly no documentation is needed here as each of us has his own experiences and an accompanying laundry list of anecdotal evidence. Notwithstanding the superabundance of the data of gloom, it would be refreshing to inventory the positive and optimistic side of the coin for a change. And I hope that the conference will faithfully devote itself to an examination of the plus side of research achievement and its relationship to the general notion that (1) Americans have and will continue to work for a living, (2) we endorse freedom of occupational choice and respect for gainful work, and (3) education for work is a desirable outcome of American Education.

If you will accept my personal bias, that vocational and technical education (call it "occupational education" if you wish to quibble about words) is intimately related to our myriad of social problems these days, then we have the basis for the real "meat and potatoes"--the take-home pay--which could make this conference a frontier experience and contribution.

General Rationale and Spirit of the New Legislation

Obviously, every law, code of behavior, book of rules, and legal framework has a spirit and letter. By and large, Americans like to play to the spirit of the law. Few specialized areas of education in our country have had the tradition of legal framework which now amounts to better than a half-century of special Federal-State-local legal arrangements for vocational education. As such, the legal provisions have invariably reflected the tune of the times in world tension and conflict, recession and depression, or to plug a leak in the technological and manpower dike. The legislation has had two outstanding earmarks: (1) it is, and always

has been, categorical, and (2) by its "patchwork" nature of the past it has not been all-inconclusive in facing up to the total task of either the place of vocational education in the schools or its position in national manpower policy and planning. Both have caused, and will continue to cause, a great deal of controversy. Periodic attempts at national appraisal of the legislation and its product have been, on the whole, highly subjective as a result of inadequate and incomplete data and the absence of a research framework appropriate to the task. The fact remains that the law has evolved and emerged. It continues to do so as the result of many powerful forces which are selected and briefly described here, but not explained in depth:

1. The nature and number of our social problems and their relation to education--and to vocational education.
2. The technological, economic, and political trends and issues.
3. The challenge to relevancy in education.
4. The American versus the European system of vocational education.
5. The academic and liberal disdain for vocational education.
6. The nature of learning in institutionalized settings.
7. The switch from job-centered to people-centered vocational education.
8. The bureaucratic, professional and disciplinary impasse.

Undoubtedly, each of these forces is not discreet and unrelated to the others and to many more which are not considered here; perhaps to your way of thinking, you would order a priority of another nature. To summarize the total impact of the combined forces it may be trite to say that vocational education is everyone's business. But it is apparent that we have reached this stage of concern and involvement with vocational education as a public endeavor--it may be, in the final analysis, our only salvation.

The evidence upon which to analyze, point up, and focus the impact of each of our present-day forces is easy to come by:

1. Socially, vocational education must accept its role, however limited or grandiose it may be, to alleviating our troublesome social ills. At first blush, this function seems inter-related to employment, equal opportunity, upward mobility, the economics of earning and contributing, and many other imbalances. On the other hand, how does this relate to crime on the streets, juvenile delinquency, poverty, hunger, rioting, destruction of private property, etc., etc.? The President is well advised to not take a walk on the streets of our Nation's capital city, and you and I share his displeasure with this encroachment upon personal freedom. But to what extent is vocational education involved in overcoming a climate which produces this condition and many others not unlike it?
2. The dramatic nature of our unfolding technology, its relation to the national economy and that of the individual states, the politics of education and trained manpower--these forces have

more discernible and intimate ties to vocational education. By and large, however, these are not new twists in the legislation of vocational education. Formally, technical education was faced up to, however adequately, in Title VIII of the National Development and Education Act of 1958, and long before the advent of the systems analyst, at least the Congress was not hard put to place a measure of sound economic faith in vocational education. Politically, the Congress has re-affirmed its faith in VEA 68 with astounding enthusiasm and endorsement to a point of embarrassment, especially to the administration and current appropriations of the Bureau of the Budget.

3. The problem of educational relevancy--the work of the schools--is more than suspect. Perhaps the descriptor "dissatisfied" is too mild, and the adjective "repudiated" too harsh. But we hear both with too little clarification and too much documentation. "Too many drop-outs," which Phi Delta Kappan calls "the fortunate few." "Too much emphasis upon the college bound." "Vocational education, too little--too late." "The failure of the American high school" Do you recognize any of these?

Washington Post writer Peter Milius in reporting the recommendations of President Nixon's Task Force on Education states the condition in this way:¹

The task force declared that "the failure of education in most of our larger cities is now so great as to constitute one of the Nation's most serious domestic problems."

It may be a particular problem, the group noted, for Mr. Nixon, "who had the support in the election of neither city residents generally nor minority groups."

"Indeed," the task force went on, "it would be fair to say that with minority groups living in urban ghettos the new Administration faces an attitude ranging from skepticism and cynicism to outright sullen hostility."

Elsewhere in its report, the task force spoke of "the general lack of humanity in the public educational system of the Nation . . .bureaucratic inflexibility . . .outdated curriculums . . .the rigidity of poorly trained teachers."

4. The role of the public schools and the place of vocational and technical education in it is more than seriously challenged these days. To my knowledge, public vocational educators have been speculating on the final outcome of this trend to remove vocational education from the public schools for a decade and a half. The switch is occurring rapidly and with a grand flourish,

and we have on more than a threshold an American system which is "European," and, of course, aristocratic. Regardless of the causes and blame for this condition, we can look for the trend to continue to the point where the American high school may contain a small, secluded occupational orientation program of a sort for those youth who cannot cut the academic mustard and rigors of the college bound. It will be interesting, however discouraging and sad, to observe the ultimate reaction of the public, particularly that of parents whose sons and daughters may be compelled to enroll in vocational courses outside the responsibility and control of the American public educational system. At the moment, our band-aid efforts of job training are coming up for inspection and interesting comment. The Washington Post, in an article titled "Job Training Dilemma," summarizes too hastily (1) Sam Levitan's Job Corps Evaluation, (2) Representative Edith Green's "high costs and questionable results" opinion, and (3) the future plans of private training contractors to be responsible for both screening of students and job placements, and the siphoning-off of 15 and 16-year-olds from their programs.²

5. Historically, the academic, liberal and vocational aspects of education have never formed a compatible and mutually-supporting mix. It is probably hoping for too much to expect them to. It is extremely awkward, then, to recognize American greatness in generally the application of pure research and learning--the success of gadgetry, application and adaptation--and the disdain for the vocational and practical in education. To complicate the conflict we substitute the term "general education" for the "academic" and "liberal" and continue to pose it as the antithesis of the vocational. If you think that this condition is artificial, I shall agree with you. If you think that it has no bearing upon the future of vocational and technical education, then we have the basis of an interesting dialogue. Witness the current trend to "generalize" vocational education to the point where it has no definition and becomes "occupational orientation." Notwithstanding the great merit that all of us need occupational orientation for our participation in the world of work, occupational orientation is not the over-riding purpose of vocational and technical education and cannot meet all of the occupational needs of youth and adults. A House Report on the Vocational Education Amendments of 1968 bridges vocational and academic education in this way:

Occupational education should be based on a spiral curriculum which treats concepts at higher and higher levels of complexity as the student moves through the program. Vocational preparation should be used to make academic education concrete and understandable, and academic education should point up the vocational implications of all education.³

6. Basically, the theory of vocational and practical arts learning has most of its roots in learning by direct experience. Vocational and public school people have never verbalized this theory to the point of understanding of the general public and of their

own students. Quite the contrary, we have been quite prone to back off from the learning by direct experience theory and adopt the respectable read-lecture-recite method of faculty psychology which was disproven a half-century ago. Worse yet, our programs become institutionalized into cozy, administrative packages to which are attached credits, units, clock hour and grade point requirements which cannot be reconciled either to the divergent aptitudes or learning abilities of our students. There should be little wonder over the predominant reason for our student drop-out rate.

7. The "Great Society" is people, and current legislation is people-centered. Possibly this fact may mean that we shall pay more attention to the needs of people than we shall to the needs of business and industry. Obviously, we should do both if our sophistication and maturity are up to the task. The problem boils down, at least on the operational level, to an equal concern for both student and subject matter. As tremendously complex as this process is acknowledged to be with average or "normal" students, we are now formally confronted with the disadvantaged and handicapped, and their needs are "special," indeed. In this connection with the special needs and the disadvantaged and the legal provisions made for their betterment, if we as vocational educators were skeptical that Congressional intent was to be taken seriously in the act of 1963, we can rest assured that the intent permeates both the spirit and letter of the new act. Congress has given us another chance--perhaps a mandate--more than an expression of faith. It should become a central concern of our total program including that of technical education and the development of professional personnel to staff the enterprise.
8. The long-enduring legal structure of vocational education has given it more than a slight bureaucratic flavor. With recurring emphasis of the legislation and increased dollar input, new and emerging occupations and the changing nature of occupations themselves, we witness a snowballing process which is becoming a curious combination of bureaucratic, professional and interdisciplinary relations and jurisdictions. In itself over the 50 years of vocational education legislation, the bureaucratic pendulum has swung from a Federal Board of Vocational Education (answerable to the President) to the present Bureau of Adult, Vocational and Library Programs administered by an Associate Commissioner in the Office of Education. What should be the focus of leadership and specialized assistance to the states is presently centered in the Division of Vocational and Technical Education with a Director and possibly a staff of three dozen specialists. Despite renewed legislation of the Congress and commensurate Federal dollar input, the effectiveness of the Division has been devastated by recurrent reorganizations and near emasculation of its specialized personnel. Worse yet, an examination of the organizational chart of the Office of Education reveals the presence of over a dozen offices involved in vocational education in addition to the Division. This fragmented situation is only surpassed by that found in education itself in which approximately two dozen agencies are

involved in the Federal education bureaucratic process. Former Secretary of Labor, W. Willard Wirtz described this predicament eloquently:⁴

The executive branch of the federal government is actually two governments--one political, the other professional--often separate, invariably unequal," he wrote of his running contest with the civil service hierarchy.

Primary reliance on written instructions and reports, Wirtz said, produced such a mountain of paper that it was often ignored and led to too much rigidity in carrying out programs. "Written communication in the department suffers from arthritis complicated by delegation. When most of what is written is prepared by someone other than the signer the writer assumes only ersatz responsibility.

The department's effectiveness would be doubled if its prose were cut in half, if those who initialed documents read them, and if those who signed them wrote some of them. In none of this is the Department of Labor in any way exceptional."

If one's mind can assimilate a bureaucratic network of these dimensions together with its attendant professional and interdisciplinary entanglements it is a nimble mind, indeed, and one which should stretch itself to comprehend the total task of bringing education and vocational education to the American people.

The government giveth, and the government taketh away. Confused be the name of the government.

This paraphrase appears to sum up the operations of government insofar as providing jobs for teenagers is concerned. On one hand, with an expenditure of some \$280 million dollars, 33,000 youngsters are being given job training under the Job Corps, but on the other hand, the wage/hour law has apparently knocked out of existence 447,380 jobs for teenagers.⁵

In summary, then, the total spirit of the new legislation is a product of many people, many forces, and a great amount of history. VEA 68 has been coming and shaping up for a long time. It is ironic that it is labeled "amendments." This it is not. It is a new deal, with a new deck, in a new game. The new book of rules we are formulating in this conference and the others to follow.

The Disenchantment of Research

Our interests and faith in research should not assume a similar universal attitude on the part of others. In addition, the overall administration of research in government is subject to the rigors of bureaucratic treatment which has already been mentioned here, in addition to the attitude of Congress. In consideration of the number of fingers in the research pie at both the national and state levels, it is little short of amazing that any research administrator can make very much sense of his judgments and decisions, even to his own professional satisfaction. This condition is especially true of vocational research administrators who, by and large, are Johnnies-come-lately and are learning the new ropes.

No doubt, the disenchantment process starts in many ways and has its own ways of generating a full head of steam in our ranks with consequent blasts to the Congress. If our efforts with research dissemination and utilization of research results were equally strong, we would be world-beaters at overcoming the traditional educational lag.

Congress is disenchanted with government-sponsored research. It will continue to become even more disenchanted as one might easily judge from the evidence now showing in the popular communication media and the severe criticism of R & D spending in the defense budget. Research in the behavioral sciences seems especially suspect. We can expect the presence of numerous "strings" to research funding of the future, and the least we should anticipate is the requirement that research results have great visibility--visibility to the members of Congress.

We may also project the visibility criterion to be quite active with members of legislatures of the States. To most of us, this reaction strikes closer to home. Of course, on the other end of the continuum, local or grass roots visibility must occur for the sake of educational change, and if for no other reason than the fact that the grass roots application is the most viable to Congressional influence in the first place. Lastly, but not least in importance, is that visibility important to the Commissioner of Education (in the case of vocational research) and its relation to the responsibilities delegated to him by the law?

There is documentation of disenchantment on the parts of state directors of vocational education. Their displeasure generally stems from the nature of research, its vague relationship to operational problems and the determination of needs in their states. It should not be assumed that their dissatisfaction is universal in all of the states or necessarily accepted in any given state. The vocational research community, at least since the advent of the Vocational Education Act of 1963, is highly conglomerate and includes the interest and participation of numerous professions, disciplines, private and public sectors, and agencies very few of which talk the same language or understand and employ the same methodologies. Herein probably lies our most important general research problem. In a recent survey of all state directors of vocational education, Walter Arnold discloses:⁶

Of the 53 responses, 29 revealed a general dissatisfaction with the vocational education research activities at the Federal level.

Dissatisfaction is not directed at personnel of the Bureau of Research, USOE, but rather at the general nature of the research and the status of the research division in the U.S. Office of Education organization. Analysis of the reasons for dissatisfaction disclosed a very serious communications gap between the Bureau and the State administrators of vocational and technical education.

Arnold's data also deal with the sophistication of research, its fragmentation, the absence of research priorities, the need for practical research and its relation to improvement of the quality and adaptability of the vocational program, dissatisfaction with state programs of research, including in some cases the work of Research Coordinating Units, favorable attitude toward the work of research centers at Columbus, Wisconsin, and North Carolina, and other aspects of the research program. It is opportune that the generalizations of the study are available for investigation and implications as we move through the national conferences and regional clinics and their synthesis.

The Letter of the Law--the Change in Emphasis

In addressing ourselves to the specifics of the law, including but not limited to those for research, what are they and what are their implications? A selected few are:

1. Basic focus of purpose is "access" to vocational education.
Comment--People-centered, people interests, and needs. Repeated subsequently "for persons of all ages in all communities."
2. Advisory (?) councils are formally installed.
Comment--Examine the make-up and functions of the councils and the way in which they are related. Note, especially for research implications, the emphasis upon "program effectiveness," reporting, evaluation, dissemination, use of technical assistance, making of duplication studies and reports, etc. Parenthetically, and I leave the question open-ended, what is the implicit and explicit intent of the Congress in the establishment of the councils?
3. Evaluation is a consistent thread.
Comment--This is to assure quality in all programs and services; also related to information regarding current and projected manpower needs and job opportunities.
4. Description of the nature of the state plan has numerous research connotations.
Comment--Long-range planning, description of present and projected needs, periodic evaluation, new and emerging needs, needs of all population groups in all geographic areas and communities, assessment of resources of local educational agencies to meet their vocational needs, relationship to employment system offices of the states and other organizations for manpower needs, etc.

5. Research provisions are authorized at ten percent of appropriations.

Comment--This is Part C of the law. Authorizations are scheduled in Section 102(a). There seem to be research implications (evaluation) in Section 102(c). Part C is for both research and training as indicated in sections 131(a), Commissioner's authorization; 131(b), state board's use in accordance with its state plan; 132, uses of Federal funds; 133, applications; and 134, payments.

6. New ways are sought to create a bridge between school and earning a living.

Comment--The accent here is on new ways to create a bridge. Its purpose is to develop means for commensurate attention to the two-out-of-three youth who are not college bound, as is presently devoted to preparation of youth who are going to college. Research implications may be seen in evaluation, (2) curriculum development, (3) occupational skill requirements, and possibly others. Special emphasis is made for youth who have academic, socioeconomic, and other handicaps.

7. Once again, we try for residential vocational education.

Comment--The commissioner is urged to give special consideration to the needs of large urban areas. This is good as far as it goes, but is there not a real place for this consideration of youth in out-lying America?

8. Homemaking education is singled out for special treatment. This fact is true of no other service or category of vocational and technical education.

Comment--"Consumer education" is emphasized in the Part F title, but loses its identity somewhat among the other delineated purposes. Research is also mentioned in "ancillary services" to assist in assuring quality in all homemaking programs.

9. Legal recognition, and emphasis authorizations for vocational cooperative education are vigorous and progressive.

Comment--Part G's purpose is to expand cooperative education. We should note that the legal description of the term (cooperative education) is not synonymous with "work study" which is Part H of the law. Congress seemingly insists upon the joint planning and supervision by the school and employers for the student's education and his employability. I hope that the regulations will spell out the requirements for coordination of in-school and on-the-job experiences to avoid the degeneration of the program to general work experience and occupational orientation, as valuable as these generalities are. Congressional "learning theory" is highly progressive and as fresh as tomorrow in this program with its direct experience base and educational planning. At least part of the research challenge is in the identification of suitable jobs, curriculum revision, evaluation, and other aspects which are unique to the program.

10. Congress admits the complexity of vocational curriculum development in Part I, but puts its emphasis on (1) new and changing occupations, and (2) the coordination of improvement in and dissemination of existing curriculum materials.

Comment--The intent comprises a strong and critical challenge to curriculum research, dissemination and utilization which is

more than a one-shot process. The provisions have great implications for survey research, materials development, evaluation, investigation of standards, and preparation of curriculum personnel.

Inject a personal bias here that curriculum development in our field has always been, and will continue to be, our top priority problem. It is high time that we marshal research efforts to make the curriculum of vocational and technical education meaningful, realistic and up-to-date.

11. A miniature vocational education manpower act is contained in the new law.

Comment--Leadership and professional personnel development is the over-riding purpose of Title II which becomes Title V of the Higher Education Act of 1965. It is important to bear in mind that this Section (201) is Part F and consequently has become a companion to Parts C and D of the law and all of which are now administered by the OE Bureau of Educational Personnel Development. In this connection, I am not treating the provisions of Parts C and D other than to indicate that their resources are available for vocational personnel development and they should be investigated and put to work. No dollars are assigned to current appropriations for Part F, and this default should be corrected. Our immediate research interest in this conference impels me to flatly state that if we are serious about the education of vocational researchers (and research input to the education of other leadership, including teachers) we need to be aggressive in exploiting these provisions to the ultimate.

Basically, Part F provides the framework for the development of all vocational education personnel through: leadership development awards; advanced study; exchange programs with personnel in business, industry, public, private employment; in-service teacher education; and short-term institutes.

Part F is our strongest hope for the future.

The Breach Between Authorizations and Appropriations

The dichotomy between what we have and what we should have, or, in other words, what Congress price-tagged the new bill and what the Bureau of the Budget is letting it go for is not describable by an appropriate adverb in my vocabulary. Recall, in the first place, that the new law is not a fair-haired boy of the previous administration, but it apparently was of the members of the 90th Congress. Current appropriations, therefore, are less than meager, and I hope that this fact is not news to you. The AVA Washington Letter of one month ago points up the discrepancies and makes the following analysis of the Budget for Fiscal Year 1970 (July 1, 1969, through June 30, 1970). It should present a strong consideration for this conference, and therefore I insert page 4 of the Letter for your information and at least food for thought in the smoke-filled rooms. In particular, our concern for research funding is invited to a short paragraph of the letter which states:

"Research efforts of the past seem to be 'out the window'. Only a meager amount of \$1.1 million to the States is budgeted. The budget does not even conform to P.L. 90-576 which calls for an amount of 10% of funds appropriated under Part B of the Act."

VOCATIONAL EDUCATION BUDGET FOR FY 1970

	<u>Authorized</u>	<u>Budget</u>
Smith-Hughes	7,161,000	7,161,000
Vocational Education Act of 1963 as amended and section (402) of the Elementary and Secondary Education Act		
-Grants to States (Part B) 90% of amount authorized (Includes development and administration of State plans and evaluation and dissemination activities authorized under section 102(c) and also includes transfer to Secretary of Labor under section 103(a) \$2 million and for State Advisory Councils \$1,680,000).	508,500,000	234,216,000
-Disadvantaged	40,000,000	no budget
-Exemplary Programs (Part D) (50% must be used in FY 1970, 50% remains available through FY 1971)	57,500,000	13,000,000
-Consumer and Homemaking Education (Part F)	25,000,000	15,000,000
-Cooperative Vocational Education (Part G)	35,000,000	14,000,000
-Work Study	35,000,000	no budget
-Demonstration Residential Schools	30,000,000	no budget
-Grants to States for Residential School planning	15,000,000	no budget
-Curriculum Development	10,000,000	2,000,000
-Research Section 131(b) or formerly 4(c) under P.L. 88-210--10% of authorization under Part B (No state less than \$15,000 for planning experimental programs)	56,500,000	1,100,000
TOTAL	812,500,000	279,316,000
Elementary and Secondary Education Act Planning and evaluation authorized under Sec. 402 (ESEA amendments of 1967)	such sums as may be necessary	1,000,000 as grants to states
Education Professions Development Act Grants to states, training programs, encouragement of educational careers	370,000,000	105,000,000
Manpower Development and Training Act (Institutional \$8,000,000)	such sums as may be necessary	688,396,000

Legal and Professional Requirements to Implement Research

Putting the research show on the road under the new VEA 68 framework seems to carry with it several broad obligations which appear to be common among the States: (1) the ordering of the State Plan in terms of compliance with administrative regulations and, hopefully, guidelines which will evolve; (2) the back-up of planning on the part of each State with professional activity which goes beyond the urgency of State Plan input. It is an underlying assumption that (1) all vocational and technical education personnel will critically review the entire statement of the Act (Public Law 90-576); (2) immediate steps will have been taken to involve the interest and participation of the public and private sectors; (3) administrative regulations and guidelines (when procurable) will be reviewed and form a plan of action for state plan development, determination of long-range objectives and their achievement; and (4) participants in State Plan development will go beyond those administrative regulations which pertain to their specialized fields or function. Obviously, there should be as near total involvement as possible unless we, once again, must learn the lesson that the time to "sell" the State Plan is in its making.

Research Input for State Plan Provisions

The following statements are confined to Part C of the law for research and training. Compliance with regulations for Part C is the minimum expectancy. As I have previously indicated, there are numerous implications for research and training throughout the Act; some are inferred; some are spelled out. Undoubtedly, planning for all of them within Part C and outside of it should be ultimately related in what I would choose to call a "master plan for vocational and technical education research" in a given state. Anything less is a violation of "practicing what we preach" in research planning.

1. Basically, Part C funds are for (a) establishment and operation of the State research coordination unit, and (b) making grants to colleges, universities, local educational agencies, public or nonprofit private agencies or institutions, contracting with a private agency, organization or institution. The purposes of these grants are for:
 - (a) research and training programs
 - (b) experimental, developmental, pilot programs (for special vocational needs of youth, chiefly those who are disadvantaged in economically depressed areas.)
 - (c) dissemination of information
2. The research coordination unit should be described (organization, activities, functions, staff) in one of two connotations:
 - (a) if it is a unit in the organization of the State government, or
 - (b) if it is an agency or institution carrying out RCU functions but not the state board.

3. The manner in which grants and contracts are applied for policy and procedural framework.
4. The proposal or application reviewal process should be indicated. Criteria for evaluation of proposals should become part of the policies and procedural framework.
5. How will the State board act on applications?

The Formulation of Research Policy and Professional Participation

This conference is unique in that it offers the rare opportunity to understand, communicate about, and help design research policy and procedure for the future. We shall not complete this task during the conference; it would probably be unfortunate if we did, for more than likely, we would stop communicating about it.

I do feel in drawing my presentation to a close that there are several critical issues which face us, and we should confront them:

1. Inasmuch as our resources for research will be limited, perhaps very severely so, research personnel and program operating personnel must take steps to influence decisions. Professionally we should examine more than one side of the coin, look at the most mileage for our money, and determine impact. We cannot achieve these objectives if we do not understand each other's function and relationship to research.
2. Our research and practitioner personnel should devote a great deal more effort to dissemination of research and research utilization. In this connection, we can well consider the generalizations of Brownell and Bloom, although their comments are primarily related to the first published assessment of the output of the nine R & D centers funded by the USOE. While basically the assessment indicates that too little of the "prolific output" (with a few major exceptions) has filtered directly into the classroom, Brownell and Bloom are in agreement on the weakness of dissemination. Brownell states, "...dissemination through issuance of reports which are not read is an exercise in futility." He also prescribes:

...more advance planning that takes school personnel as equal partners in research and gives schools a timetable for field testing and demonstration; priorities that relate to the needs of school personnel; and less emphasis upon the numbers of research studies and more upon the quality control. Perhaps on each Center staff there needs to be a tough-minded person competent in research and knowledgeable about school practices and problems who can and will challenge each proposal with "So what?" and confront conclusions with "What is the evidence?"

Bloom simply states his skepticism about university establishments as disseminators except to other universities and researchers, and the most serious shortcoming of the lack of dynamic models or theories.⁸

3. Regardless of our satisfaction with research results and productivity, we must make concentrated efforts for research input into personnel development programs at all levels. Apparently, this should not focus solely on the preparation of the researcher, but all personnel development programs should have appropriate and functional research input.
4. Is there a middleman needed on the research utilization team? Can we bridge the gap between practitioner and researcher with any degree of success in education change? What is the basis for the suggestion that we need a translator, marketer, application specialist to round out theory into practice? If we are serious about the shortage of educational manpower these days and seek to correct it, it seems that the idea of differentiated staffing should not be limited to the teaching function.
5. The research enterprise must become a common denominator with the national and state advisory councils. We should expect some hesitancy on this consideration, but let us break the semantic barrier. If we do not, perhaps our lay council members will insist that we do. We can expect little let-up on both evaluation and accreditation of all forms of vocational and technical education on all levels. Inasmuch as this has become both interdisciplinary and inter-professional, it will demand our best effort in communication.
6. Last in my order of strategies and responsibilities, but probably first in importance, is the matter of organized professional focus. By professional focus I mean the marshaling of the total vocational and technical education profession to the overall task for the immediate present and the foreseeable future. Unfortunately, but understandably, we hear too little, if anything, about mustering professional strength these days. On the other hand, the basic assumption still remains that in the final analysis vocational education, sometimes nebulously referred to as "the establishment", is responsible for the ultimate implementation of the program. May I suggest, therefore, to my brother vocationalists as we glance around for professional focus that this point of impact is the American Vocational Association and its federation of associations in your states? The question may suggest that I am about to embark upon a membership campaign for our organization, and I shall gladly admit my eagerness to process your membership card. But, quite to the contrary, the amount and nature of mutual support which has been and will be required can only be concentrated in our professional organization which can adequately represent us through our participation. This fact is my final recommendation; you may consider it "strategical" and "tactical"; both will be required in the days and years ahead.

Vocational education has, indeed, come of age and is everyone's business. After all, this stage of development is the American Way. Our experience and final faith in the American Way assure us that we are up to the task--it is the only way.

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INFORMATION SERVICES FOR IMPROVEMENT OF VOCATIONAL EDUCATION

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One of the major themes contained in the 1968 Amendments to the Vocational Education Act is a commitment to the idea that education is as amenable to improvement through research, development, and diffusion of scientific knowledge as are medicine, space and aeronautics, and other fields of high national priority. Unless such a commitment is implemented through effective and continuous transmission of the results of research and development to individuals who make and implement decisions relating to vocational education, it will be nothing but a pious, unfulfilled hope.

I believe that an essential condition for deriving the benefits intended in the 1968 Amendments to the Vocational Education Act is the development of a multi-level technical information system for all of education. By a technical information system, I mean a systematic organization of resources for acquiring, screening, processing and disseminating the information contained in a corpus of data and documents in order to make the results of research, development, and current practice available to educational decision-makers, practitioners, and others concerned with educational improvement. By a multi-level system, I mean one in which there are cooperative, articulated services with appropriate differentiation of effort at local, state, regional, and national levels.

Such a system can bring four benefits to education:

1. It can provide the basis for more rational problem-definition, policy-formulation, and decision-making.
2. It can provide intellectual resources for implementation of such policies and decisions.
3. It can make available specific information required for performance of continuing educational operations.
4. It can offer verifiable, reproducible information of use in evaluating program operations.

Having identified the objective to be attained, we need to consider the resources and constraints that will impinge on the steps taken for attainment. I shall, therefore, spend the remainder of my time with you today discussing:

1. What we can learn from fields other than education about effective transfer of technical information.
2. What elements are included in an effective technical information system.
3. Our current status in technical information transfer in the field of education.
4. Next steps toward development of a viable technical information system for education.

I. Experience Outside Education in the Transfer of Technical Information

It is important for us to draw upon the experience of other fields in technical information because most of the solid evidence in this field was collected in other disciplines. One must be cautious in generalizing from agriculture, medicine, or industry, since information use is conditioned by the subject area, the organizational setting, and the role filled by the practitioner, (8), but certain findings emerge so consistently in a number of fields that we may use them for tentative planning in education. Two bodies of literature contain these findings: the "Diffusion of Innovations" literature and the Information Science literature.

A. Diffusion Literature

Everett Rogers (15) has analyzed some 500 studies of the diffusion of innovations in such fields as medicine, agriculture, and industry. He also considers some of the work done in education. Lippitt (11) cautions against too much reliance on the results of diffusion studies involving individual practitioners such as farmers and physicians in planning for educational or other social change, but Rogers' analysis of the adoption process appears to apply as well to innovation in the setting of educational organizations as it does in adoptions by individuals.

He describes the adoption process as a specialized kind of decision-making in which the rational adopter goes through five stages:

1. Awareness, in which the potential adopter learns of alternatives to his current practices;
2. Interest, in which he seeks out more information on the alternatives;
3. Evaluation, when he makes an 'in-the-head' assessment of the relative advantage and appropriateness of the innovation for him;
4. Trial, in which he actually tries out the innovation on a limited basis; and finally,
5. Adoption, when he begins full scale, operational use of the innovation.

Of particular importance to us here is the evidence Rogers cites indicating that potential adopters rely on different information sources at different stages in the adoption process:

1. Awareness usually comes from the mass media (although the most conservative will learn of innovations from earlier adopters);
2. Interest calls for interpretive information, either from more innovative practitioners or from more technical, interpretive or integrative documents from the source of the innovation;
3. Evaluation involves heavy reliance on interpersonal communication from sources near at hand; and
4. Trial also involves much interpersonal communication, although recent evidence suggests that some potential adopters in organization settings such as industry and education find special 'packages' of interpretive information of value.

B. Information Science

One major line of inquiry in information science has to do with identification of information needs and information-seeking and using behavior of the clientele of information systems. Another has been research and development on system design, operation and evaluation. Both have usually been pursued for the explicit purpose of establishing information policy for the professional association, private industry, or governmental agency that has sponsored the research (14).

With regard to the behavior of information users, Herbert Menzel (13) identifies five different information-seeking modes or motivations:

1. The current approach. The user wants to keep up to date in a field in which he is already competent.
2. The everyday approach. The user seeks specific bits of information (down to specific facts) in order to complete a specific task at hand.
3. The exhaustive approach. The user seeks to identify in some depth all information available on a given topic, usually before initiating some new, complex task.
4. The brush-up approach. The user seeks an overview of some topic outside his own immediate area of competence.
5. The browsing approach. The user skims, more or less serendipitously, outside his predetermined field of interest.

Taken with the evidence from the diffusion literature, it is quite clear that an effective information system must provide a variety of information products, not only for different segments of the clientele, but for the same client at different stages of his work.

A second generalization growing from both research traditions is that the closest and most accessible information source is the first used and the most frequently used, regardless of the user's opinion of the quality of the information provided; however, his acceptance and application of the information is influenced more by his perception of its technical quality than by its accessibility or ease of using the information source (1,4).

Third, both fields of inquiry point out that person-to-person communication, particularly within the work team, is the preferred and most frequently used information source among practice groups.

How relevant is this set of conclusions to education? Almost all we have to go on is a study attempting to identify the preferences that public school teachers and principals have for certain characteristics of information systems (9). Even granting that expression of opinion by user groups is a notoriously poor indicator of how to improve an information system (14), the relative value that educators place on system characteristics is instructive. Seven system characteristics were ranked, with the following consensus order: (1) ease of access to the system; (2) currency of information provided; (3) comprehensiveness

of coverage of sources; (4) speed of service; (5) evaluative review of information provided; (6) thoroughness of documentation; and (7) flexibility of products and services.

Put succinctly, no matter how sophisticated an information system may be or how good the information it contains, it will not be used unless it is close enough for the user to touch it without reaching far. In addition, since people prefer to interact with people, there is need for a human contact point between the user and the system that is prepared to provide the user a variety of information products tailored to the individual client's needs and characteristics.

II. Components of an Effective Educational Information System

Three components of an idealized information system will be described: the products the system should generate; the functions it must perform in generating them; and the services it must provide to assure utility of the products.

A. System Products

An educator should be able to expect a variety of information products from a system that is truly responsive to his needs. Three of them are what might be called basic products, because they are acquired by the system to be disseminated in more or less their original form, and also because these products can be used to generate a range of other information products that are frequently of more value to the system client than are the basic products themselves.

Perhaps the most obvious basic product is the document. Among the types of documents school people find of use are technical reports of research, case studies of exemplary programs, and non-experimental evaluation reports. Second are items of interpretable data. Note, however, the interpretable: if the data do not grow out of standard terminology the user will find himself constantly trying to make meaningful combinations of apples and chickens without knowing that he is dealing with unlike things. The third basic product consists of rosters of people and locations from which system clients can get additional information to that the system itself contains. These are referral materials.

Derived materials based on the raw materials of basic information products should grow out of client requirements as identified by user studies, such as those discussed above as being the basis for information policy. The most familiar derived product is the bibliography which may be comprehensive or selective, according to criteria established either by the system or by the client. Secondly, there is a variety of access tools, intended to help the user or his agent find what the system contains of relevance to his needs. One of these access tools is the index intended to assist the client in searching the system. While it indicates everything available on a given subject, the client also needs abstracts to eliminate irrelevant items without poring over every one of the original documents located in the search. Systems using some kind of controlled language for indexing frequently provide another

access tool--the thesaurus or key word list. It helps the client match up the concepts about which he wants information with the index terms of the system. In addition, it is helpful to the client in broadening or narrowing his search even without using the abstracts provided him.

Interpretive materials constitute another and increasingly important set of derived materials. These materials are prepared by qualified subject matter specialists as opposed to information system generalists. These content experts review reports and other basic information products from a single, consistent rationale and then produce analytic or integrative reports of the current state of the art, consistencies or contradictions in existing evidence, and similar interpretive reports.

B. System Functions

The information specialist concerned with actual design or operation of an information system will find a recent article by Donald King (10) an excellent summary on design and evaluation of information systems. My discussion will necessarily be less detailed and more oriented toward the formulator of information policy.

The first function an information system must perform is Acquisition. Without effective means for systematic and continuous collection of the information relevant to client needs, it is unnecessary to perform other system functions well, badly, or at all. A second, closely related function is that of Evaluation. Inferior or redundant acquisitions soon swallow up the information user when this function is inadequately performed. All of us have heard of the data processor's condemnation of GIGO (Garbage In, Garbage Out). Evaluation is the indicated preventive for this disease.

A third category of functions, Technical Processes, is intended to make the evaluated acquisitions both physically and intellectually accessible through abstracting, indexing, searching, retrieving, and related activities. Technical processes provide the base for the function of Dissemination, in which relevant information is provided to clients of the system in appropriate quantity and format either on demand or on a predetermined schedule for dissemination.

Information Analysis is the process by which an information system generates the interpretive materials mentioned earlier. Since information analysis involves interpretation of basic information from a consistent viewpoint, let us examine the types of viewpoints from which such analysis proceeds. Some analyses are discipline-oriented, collecting and analyzing information in a particular field of science or technology in order to create new knowledge, to analyze sources of error, or to provide the basis for decisions about next steps. Another viewpoint is the mission-oriented analysis, concerned with solution of a set of problems encountered in achieving specific practical goals. Third, there is what has been called the Census Bureau analysis, concerned with collecting and analyzing raw or partially reduced observational results of large-scale phenomena like oceanography or interplanetary space.

Although such analyses may be done on a one-time basis, major information systems have tended to institutionalize the analytic function in special centers, thereby assuring continuity of operations and availability of qualified staff. The same report that provided the categorization of analysis orientations used here also reports the existence of over 100 information analysis centers in all fields of science and technology in the United States by 1967 (6).

C. User Services

User service is a form of system function, but one that is so important and so frequently badly performed that it deserves some special attention. As Jordan Baruch has said:

In each of the substantive fields we have surveyed, we have seen the growing use of machines (in information systems) lead to a reassessment and growing appreciation of the skills of people (3).

This statement reiterates a recurring theme: the importance of an information system providing means for person-to-person contact at the point where the system and the ultimate user come into touch with each other. For so highly a pluralistic field as education, this seems to indicate the need for decentralized local or subregional local contact points manned by trained educational information specialists.

A minimum of four types of client services need to be provided:

Query Negotiation, in which an agent of the system confers with the client to define the information requirement clearly; to determine the uses to which the information should be put; and to identify any practical constraints, such as time limits for completion of the search, types or formats of information to be excluded, and so forth. The importance of two-way query negotiation was highlighted in a recently reported experimental study of a biological information system in which clients demonstrated their preference for two-way query negotiation by delaying submittal of queries to the system until they were sure of the availability of a qualified person to discuss their information requirements with them (17).

Formulation of the Search Strategy is a second client service. The agent determines how to make the best use of the system to answer the client's need within any constraints set on the search. He then addresses the system, either conducting the search himself or delegating the actual search to another qualified person.

Screening and Analyzing Search Output is another service function. This function is performed mainly to identify the need for additional searches, referral of the client to other information sources or to identify equivocal evidence contained in the output. The agent should avoid withholding documents simply because he considers them irrelevant, since evidence suggests that even a well-trained agent is a poorer judge of document relevance than is the client himself (14).

The final type of client service to be discussed here is Client Briefing, in which the agent confers with the client to discuss the

information retrieved, to determine the need for further searches, to identify additional information sources, to provide clarifying comments, and to permit the client to feedback his degree of satisfaction with the service provided. Another aspect of client briefing is formal or informal training, intended to increase the client's own ability to make use of the system.

Let me digress briefly to describe a special information system application, Selective Dissemination of Information (or SDI, as it is called in trade). A profile of user interests is developed either for individual users, or more frequently and less expensively for groups of users. The information system thereafter develops periodic listings of new acquisitions fitting user profiles and automatically sends them to appropriate clients. Dr. Douglas Towne of the Tennessee Research Coordinating Unit for Vocational and Occupational Education has led in developing such a system for the southeastern quarter of the United States. For those looking to SDI as the single answer, a number of cautions are in order. First, SDI is useful for maintaining current awareness in client groups, but does not meet all or even most information requirements. Second, unless the system includes a feedback from the client to the system as to the relevance of the information provided, the types of information provided will remain static while user interests and needs continue to change. Third, job title or work role have only limited value in predicting the interest or need profile of any given client. And finally, continued operation of SDI in a system with a high acquisition rate is extremely expensive and almost impossible without direct computer access.

III. Current Status of Educational Information Services

In considering the status of information in education, it is useful again to consider products, functions, and services; but in light of the pluralistic character of American education, to examine these at local, state, and national levels.

There is no doubt that educators have available a wider and more usable range of information products today than they had even as little as five years ago. To a large degree, this is attributable to a number of national programs: The Educational Resources Information Center, with its network of decentralized, subject-oriented clearinghouses; the School Research Information Center, sponsored by Phi Delta Kappa; and a number of other retrieval systems concerned only in part with educational information, such as DATRIX, a system for retrieval of dissertation literature operated by University Microfilms, Inc.

ERIC's contribution has not been limited just to its program of acquisition and dissemination of documents. Of at least equal importance has been its role in developing a range of access tools and techniques of use to a number of organizations in providing information products and services. One example is a commercially published collection of ERIC documents on education of the disadvantaged. Another, soon to be forthcoming is a commercially-prepared monthly index to journal literature having relevance to education and using ERIC descriptors and indexing techniques.

Although educators have better access to research results and other technical reports than they formerly had, relatively few clinical reports of current practice or of non-experimental evaluation get national distribution. Most such information is produced in local or state education agencies. It seems likely, therefore, that the state education agency is the proper mechanism to acquire documents of this sort produced within the state borders.

Less is being done to produce referral materials identifying knowledgeable individuals and sites of exemplary projects than is needed. The ERIC Pace-Setter volumes are a type of referral resource, but they are limited to reporting projects supported under grants from Title III, ESEA. Other referral materials are being developed by some ERIC Clearinghouses, while occasional referral lists are produced by individual research projects. At the regional level, the Michigan Ohio Regional Educational Laboratory has developed a procedural model for development of data banks and referral services. Nonetheless, there is no continuing, systematic national referral system devoted exclusively to education.

Interpretive materials are being produced at a greater rate than in the past, but probably in insufficient quantities to meet information requirements of educators and with relatively little awareness of use needs. The American Educational Research Association has long been engaged in preparation of discipline-oriented analyses directed to the research through its Review of Educational Research and its decennial Encyclopedia of Educational Research. Mission-oriented analyses prepared for the classroom teacher are produced in the National Education Association series, What Research Says to the Teacher. ERIC Clearinghouses are putting increasing emphasis on production of both discipline-oriented and mission-oriented analyses. Finally, the Bureau of Research provides contract support for mission-oriented interpretive studies keyed to the requirements of the educational practitioner and decision-maker.

In some ways, educational data products and functions are amenable to more effective handling than document-based programs, but at the present time, data are not being used as effectively for national decision-making as are documents; in addition, there is a tendency to underestimate the problems involved in developing a national data-based information system. Significant steps have been taken through the Accounting Handbook series under the National Center for Educational Statistics, OE, and the program for development of a taxonomy of Vocational Education under the Bureau of Adult, Vocational, and Library Programs, OE.

In addition, a number of operational or demonstration programs of data applications can be found. Among these are the Midwestern States Educational Information Project, a Title V ESEA interstate project located in the Iowa Department of Public Instruction; the data program of the University of California; the Tex-Pak system in Texas; and the Integrated Educational Information System operation out of Oakland, Michigan and looking toward a system for teleprocessing to other school districts. However, these systems are more noteworthy for their use of data systems for sophisticated accounting procedures than they are for the applications as management information and control system.

For those who expect to find high-powered management information systems in the private sector just waiting for educational adaptation, it is noteworthy that the president of a highly esteemed company specializing in information system design was unable to identify a combined computer-based system being used as a primary and central control mechanism for an entire corporation as late as 1965 (2). Whether models yet exist in corporate settings may still be questionable, since Dr. Edwin B. Parker, Institute for Communication Research of Stanford University, recently asserted in a private conversation that he was unaware of a single combined data and document management information system that could be justified on a cost-benefit criterion.

Now for a look at the current status of client services in educational information systems. By and large, the educational practitioner is left in splendid isolation with his abstracts, indexes, and microfiche--but not always with microfiche readers. To the extent that their extensive range of responsibilities permit, ERIC Clearinghouses serve practitioners and other information users in education; but by and large, such services must be limited to organizations and agencies that serve as gate-keepers for groups of individual users. The Clearinghouse on Vocational and Technical Education is one of the most responsive to user groups in its area of responsibility, but even with its strong commitment to user services many of the needs of the vocational education community can probably be met only by channeling some queries to other ERIC Clearinghouses and other appropriate information mechanisms.

Vocational education has another impressive locus providing user services in the State Research Coordinating Unit. The combination of subject expertise and commitment to a clearly defined clientele permit development of services like the SDI system already mentioned. Depending on the size and geographic distribution of the client group, the RCU may be the most viable means of providing the human connection between the user and the system discussed above. The fact remains, however, that the RCU has a large number of functions to perform, usually with very limited staff and economic resources. Thus the role of the RCU in an educational information system will have to be weighed against its other roles and other possible alternative information resources, with the final answer based as much on operating constraints in the individual states as on the commitment of RCU directors to information transfer.

Less directly related to the area of vocational education there are a number of other developments deserving mention. At the state level, California has established a Bureau of Reference Library Services that operates depositories of curricula and other materials at the county level. This Bureau is to have an eventual tie-up with the data system of the state, but at present it serves primarily as one approach to the problem of within-state acquisition and dissemination of internally produced documents.

At least two Regional Educational Laboratories have engaged in developmental work in information science. The MOREL data and referral system, already mentioned, has been adopted by the Ohio Education Association as a means of providing technical information services to Ohio

teachers and administrators. The Far West Laboratory for Educational Research and Development has a Communications Program under the direction of Dr. Paul Hood as one of its major program elements. One element in this program has been development of evaluation models and systems design work for educational information systems. Another component of the Communications Program is the development of a series of information analyses packages into multi-media "Integrated Information Units."

A particular exciting development is the emergence of a number of local information and service centers, including RISE, Montgomery County, Pennsylvania; ASSIST, Wayne County, Michigan; a county network being build on the Board of Cooperative Educational Services structure in New York; and intermediate school district units in San Mateo and Contra Costa Counties, California. Some but not all of these were initiated with Title III, ESEA, grants. Each has its own unique program, but most provide such services as query negotiation, demand searches, referral, citation indexing, dissemination and/or duplication of documents, and in some cases consultative services. They are providing the kind of close, continuing liaison between information resources and information users that facilitate the use of scientific knowledge in educational decision-making.

A number of activities supported by the Office of Education are intended to improve planning for educational information transfer. In addition to those already mentioned, there are:

1. A project with System Development Corporation resulting in a series of training materials for educational information personnel and a directory of educational information service centers. These should be available before the end of the current academic year.
2. A project with Teaching Research Division, Oregon State System of Higher Education, to identify means of facilitating inclusion of state and locally produced documents in ERIC.
3. Soon to be funded, a pilot experiment for development of capability for on-line query of the computerized ERIC file.
4. We are currently reviewing proposals for a project to design alternative models for implementation of a multi-level system. Even before completion, this project should provide useful guidance to state and local education agencies in planning information systems.
5. We are now exploring means of making the ERIC file available to interested users in the form of computer tapes.
6. Subject to the availability of funds, we hope to support a design study to plan for systematic and continuing identification of information needs and information using behavior of school boards, administrators, teachers, and others making use of educational information.
7. Two summer institutes have been authorized for training of personnel for state and local educational information personnel. The dates and locations of these institutes will be found in Appendix A.

IV. Next Steps Toward an Educational Information System

Four propositions underly the suggestions that will be made for development of improved educational information services:

1. The state education agency is the essential switching point between local schools and national information resources if we are to develop an effective educational information system.
2. The complexity of designing an effective system, coupled with the costs of such a system and current information manpower shortages require a system with operating components located at state and national levels. Such a multi-level system is necessary in order to reduce redundancy in information services (and thereby reduce costs) and to assure availability of all required services to all educational information users.
3. It is not currently feasible, either economically or technically to design an operational system combining data and document inputs for high level management information and control purposes.
4. We are abysmally ignorant about information needs and information-using behavior of the educational community.

Now, as to what can be done:

1. Every state should take immediate steps to establish a technical information center, appropriately equipped with national document collections and search tools; in addition the state center should initiate an acquisitions program for documents produced within the state. Primary audience of the state center should be specialists on the state agency staff who can begin work with their several clientele groups. Insofar as resources permit, the state center may then provide information services to intermediate and local school agencies, but it is doubtful whether in any but the smallest states a single center can provide adequate response to local information needs.

In the absence of such a comprehensive center or plans for developing one, a vocational education technical information program should be established; however, such a specialized service should be seen as a pilot operation giving the state experience that will permit development of a comprehensive information system into which the vocational program can merge at the earliest possible date. In this manner, system costs and routine system functions can be amortized across all educational communities, thereby freeing RCU staff and other state vocational education personnel for information services requiring a higher level of substantive competence.

If complete or even partial collections of information resources now exist at the state level, vocational acquisitions should be supplementary, selective, and specific to the requirements of that field. Let me urge, however, that RCUs and other vocational education staff at the state level proselytize aggressively for a comprehensive information system to provide services to you as well as other communities

of educational interest within the state. For support of such information services, the state agency might look toward pooling of funds under a number of federal programs, as well as to allocation of state funds.

2. A separate data system should be established, focusing initially on uniform accounting procedures, but with system design and related activities directed toward evolution of a data-based management information system as an intermediate stage. Such efforts may be based upon the handbooks and taxonomies produced by the National Center for Educational Statistics and the Bureau of Adult, Vocational, and Library Programs. As experience is gained, steps should be taken for developments of interfaces between data and document systems through common or compatible indexing and file maintenance. Data and document systems should merge, but on the basis of adequate experience.

3. Immediate efforts should be undertaken at the state level to acquire and screen all basic documents produced at the state and local level. Such efforts should stress the development of procedures for a systematic and continuous acquisition program. In the absence of a comprehensive state acquisition program, an interim program for acquisition of documents dealing with vocational education should be begun.

Documents found to have value only within state borders might be processed and disseminated by the state agency; however, documents having value outside the state should be forwarded to a national system for technical processing and dissemination. In establishing criteria and procedures for the acquisition and evaluation program, you are urged to contact your state agency staff member who is serving as liaison man with Dr. Allen Lee, Oregon State System of Higher Education, who is project director of the State acquisitions project mentioned earlier.

4. A program of research on information needs and behavior of educational practitioners and decision-makers should be initiated in every state. Pilot, exploratory studies are possible now; ultimately such a research program might benefit from a coordinated interstate effort. In planning for such studies, your attention is directed to the Paisley (14), Menzel (12), and Berul and Karson (4) references in the bibliography.

5. At the state level (preferably for all education, but initially limited to vocational education if necessary) efforts should be made to encourage development of intermediate or local level information service centers.

6. The Research Coordinating Unit, with its distinctive location and combination of talents should serve increasingly as the state instrument for fostering improved information user services at the intermediate or local district level. As state capabilities in information transfer increase, the RCU should devote increasing effort to coordination of vocational education information activities within the state, to increased intellectual analysis of information, to adaptation of interpretive materials to state and local constraints, and to providing

a mechanism for interstate liaison. Thus, the RCU might look to become an information wholesaler rather than a retailer. In this capacity, RCUs are welcomed to draw upon the resources of the entire ERIC system and its network of 20 Clearinghouses.

7. Because of the shortage of personnel qualified to provide educational information services, you are urged to encourage attendance by members of your state agency staff or by intermediate or local district personnel at the training institutes listed in Appendix A.

8. And finally, I solicit your thoughts and comments on ways in which we can provide for a continuing dialogue on information needs and possible responses to those needs.

In summary, my plea is to do what is now doable. Begin by providing information services to vocational education communities in your state with all dispatch. But to serve your own best interests and the best interests of the vocational educators you serve, press for development of a comprehensive educational information service in your state, both to increase the resources available to you and to relieve you of more routine information tasks. In this way you may increasingly fill your roles as intellectual leaders for vocational education.

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Appendix A

Summer Institute for Operation
of State and Local Education Information Centers

<u>Title of Institute</u>	<u>Dates</u>	<u>Director and Institution</u>
Operation of Education Information Service Centers	Aug. 17-22, 1969	Venable Lawson, Director Division of Librarianship Emory University Atlanta, Ga. 30322
Establishment of Local Education Information Centers	July 13-19, 1969	Dr. Everett Edington Box 3AP New Mexico State University Las Cruces, N.M. 88001 Telephone: 505-646-2623

STRATEGIES FOR CORRELATED INTERFACE RELATIONSHIPS
BETWEEN THE TOTAL STATE PROGRAM AND LOCAL PROGRAMS OF RESEARCH

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The research authority provided in the "Vocational Amendments of 1968" offers an enormous opportunity and it describes a compelling obligation. It introduces a new dimension to the long history of vocational legislation, namely, an authorization and an implicit obligation to include research in program plans at the state and local levels. It is necessary, thus, to consider the various options available at local and state levels. This working paper will consider these options by giving attention to the following topics:

- (1) The nature of the legislative mandates, (2) the issues and problems of Federal Science Policy, (3) the structure of state and local programs of research, (4) the administrative devices and program rubrics which may be employed in alternative strategies, (5) the interface relationships and general conclusions.

The Nature of the Legislative Mandate

The background of the legislative mandate in the 1968 Amendments is published in the reports of both the U.S. Senate and the U.S. House of Representatives. The Senate report is of the Committee on Labor and Public Welfare and it is contained in Report No. 1386, 90th Congress, 2nd Session. The House Committee on Education and Labor expressed its views in Report No. 1647, 90th Congress, 2nd Session. The two reports were joined as a Conference Report which later passed as the new legislation (House Report No. 1938).

An examination of the separate House and Senate Reports is useful in observing the problems identified by Congress as they assessed the impact of previous legislation and also in observing the expectations held for the 1968 Amendments.

The Senate Committee began with a discussion of previous legislation and they emphasized that the 1963 Vocational Act did not measure up to expectations. Although it "recognized the growing need for more formal preparation for employment" and while its immediate motivation was the "high level of unemployment among untrained and inexperienced youth", it had not succeeded in changing the occupational emphases "in keeping with an increasingly sophisticated economy". "Although federal funds were increased fourfold, its objectives were not realized". "Objectives are realized by allocation and application of resources, not by declarations of intent", they said. "Neither 'carrots' nor 'sticks' were provided to influence expenditure patterns," they added.

For the first time, the 1968 Amendments have included the kind of "sticks" in educational legislation which they declared were lacking in the 1963 Act. These exist as congressionally mandated evaluations, a

requirement for public hearings on State Plan proposals and the opportunity for local agencies to appeal state and federal executive decisions by appeal through the courts.

In their comments about the research allocations of the 1968 Vocational Act, the Senate Committee concluded that "it is too early to appraise the impact. The first results of funded projects are just beginning to come in." The most frequent criticism, as reported from Committee hearings, was the lack of tangible impact on existing programs and on the development of new programs and methods. The most serious weakness which the Committee identified in the research provisions of the 1963 Act was "the insufficiency of legislative guidance." The "most significant accomplishment" of the research intent of the 1963 Act was, according to the Committee, "a recognition of the need for and the identification of individuals capable of carrying out research." This accomplishment, a mere discovery of need, still persists as the most serious bottleneck impeding the intent of the 1968 Amendment. It is most important to have guidelines which will alleviate this need.

Like the 1963 Act, the 1968 Amendment authorizes 10 percent of the appropriations to be spent on research. The Senate Committee reinforced this intent by declaring that the section of the Act "designed to support vocational education research is to be the leading edge in vocational education finding a new way of meeting new problems which arise in vocational education." If vocational educators want State Advisory Committees to be aware of this Congressional intent, it is most important that this, too, be stressed in State Plans, in hearings and in guidelines.

In strong language, the Senate Committee made some explicit recommendations about how it expected the 1968 Amendment to be administered. They observed that the Office of Education and some of the states may have assumed greater authority in the administration of Federal education programs than that which is granted by statute. Specifically, they criticized the assumption of responsibility by the Office of Education for setting national priorities upon which Federal education programs should be focussed and they criticized the actions of States which imposed additional eligibility requirements for participation in Federal educational programs. The Committee declared its position as follows, "national priorities are to be set by Congress and the basic requirements for participation in Federal programs are to be set by Federal law alone. Basic eligibility for participation in Federal funds has, unless otherwise specified by law, been reserved to the Congress and not to administrative agencies." To insure that these provisions would be available for interpretation by local agencies, Congress included the additional provisions for non-comingling of funds and appeal through the courts.

The Report of the House Committee on education and Labor was considerably more general than the Report of the Senate Committee. The House Committee expressed more concern, however, with the low priority assigned to Vocational Education in the Office of Education. Included in this concern was the small number of budgeted supergrades assigned to vocational-technical education to assist with the administration of the Education Professions Development Act.

What information is provided by this background to the legislated mandate? What conclusions can be drawn regarding the intent of the program of research? First of all, Congress continues to place a high value on research in vocational and technical education. Although their appropriations have not measured up to their authorizations, their priorities for research are, nevertheless, substantial. Secondly, they are aware of the problems of staffing for research, a recurring theme in both the Senate and the House Committee Reports. Thirdly, they want research to contribute to existing programs as well as to new programs and new emphases. Finally, they want the research programs to be a part of plans generated at local and state levels as well as at the federal level.

The Issues and Problems of Federal Science Policy

In the attempt to consider strategies for any new emphasis in research, Congress attempts to draw upon the experience of the past and to combine this with an intent for the future. The experience of the past includes the efforts to establish federal science policy and to institutionalize its direction and impact. Most recently this has occurred in the Office of Science and Technology (OST) though it began shortly after World War II in the Office of Scientific Research and Development.

The Presidential Special Assistant for Science and Technology for the past five years, Dr. Donald Hornig, has recently provided a thoughtful reappraisal of federal science policy for an era which he terms "the crossroads of introspection and examination of our national science policy."¹ It contains numerous points which will repay our consideration as we examine the interrelationships needed in a program of research in vocational education.

The major unresolved problems, according to Hornig, seem to fall into four categories. The first has to do with research and the universities. The central questions are:

1. How to provide training of high quality for enough scientists and engineers of the right kind.
2. How to maintain vigor and creativity in the basic research establishment. Merely having a research establishment is not enough!!
3. How to set priorities and determine the relative emphasis given to different research areas.

The second category has to do with the nature of research support. The central questions are:

1. To what extent should research be supported through project grants or through broad institutional grants.
2. How is it possible to wed the cultivation of the best science to the training of enough scientists and for them to exist broadly throughout the country. (How do you establish the needed critical-mass of researchers?)
3. How can the scientific community and the universities effectively communicate its purposes, its values, and its contributions to the public and to the lawmakers? (How do you build a recognition of the fact that research is related to the political process?)

The third major category has to do with the appropriate mix of governmental agencies and educational institutions. The central questions are:

1. What are the appropriate interrelationships between the various parts of the scientific enterprise, the various types of support and the various objects of support needed to construct a comprehensive blueprint or plan for proceeding.
2. What are the different mixes of government agencies and universities as well as different mechanisms for the support of graduate training.
3. How can we sharpen our analytical tools and capabilities, identify and acquire the necessary data, devise working hypothesis and be willing to experiment with the subaggregates of the system so that we will be in a steadily improving position to deal with the system as a whole.

The fourth major category has to do with the recurrent problem of achieving some balance and accommodation between the chaos of a laissez-faire system of federally sponsored research and some degree of central direction whose excesses are admittedly not conducive to the maintenance of vigorous, high-quality academic research. Centrally directed research is frequently sterile and often second-rate. Laissez-faire and free enterprising research is lively, vigorous and competitive but often chaotic!

These are the categories of problems which still remain after two decades of attempting to tool-up a national research commitment. What lessons have been learned during this period? What guiding principles have emerged? Dr. Hornig also provides these. There are three.

1. Decision-making should be pushed to the lowest responsible level appropriate to that decision. Specifically, decisions should not be made centrally on questions or issues which can be decided at a more decentralized point.
2. There is a clear need for more systems analysis on a government-wide scale. Specifically there is need for analysis that is tied to the decision-making function and also to the creative thinking of a large number of people looking at the inventive process, without undue concentration on the techniques and methodology of systems analysis. What is needed is a best current projection of the future, and of alternative futures, based on present activities and planned new ones. At the same time we should be continually concerned with the need to increase a capability for such analysis.
3. In the realm of governmental and institutional activity, conventional wisdom, conventional exhortation, and a desire for economy would suggest a rigid separation of function and a careful elimination of duplication. Yet, successful experience suggests otherwise. Agencies that have remained virile and avoided deterioration have done so, in part, by stepping on each others feet. In short, when there is a large opportunity or need at stake, it is profitable and appropriate to employ both competition and careful planning.

The Structure of State and Local Programs of Research

The structure of state and local programs of research in vocational education involves four dimensions. Its research functions, its instrumentalities, its administrative devices and its program categories or descriptors.

Research functions applicable to state plans are defined by law. They include:

1. Research and training
2. Experimental, developmental and pilot programs, especially those designed to meet special needs.
3. Dissemination of information.

The object of research is to generate new knowledge. It may take many forms. It can result from a collection of empirical data. It can describe the outlines of a new theory or shatter the foundations of an old one. It may be simple or sophisticated. Its most significant feature is the relationship of hypotheses to outcome at the time the research is begun. That relationship, very simply, is that the outcome is not known. An important characteristic of research is that negative results are tolerable.

The object of the training function is to recruit, train, and re-train manpower necessary to undertake the various functions of research. The training function is often confused with the dissemination function, a function whose objective is totally different.

An experimental program is a type of research in which there are experimental elements introduced in a controlled setting. The experimental elements may be materials, techniques, processes, administrative arrangements or combinations of these. Like other forms of research, experimental programs will tolerate negative results.

Developmental programs differ from research by the fact that outcomes are known and describeable. The objectives may be stated in the form of performance specifications. The purpose of developmental projects or programs is to produce materials, techniques, processes or implements which will accomplish pre-specified objectives. Unlike research projects, developmental projects cannot tolerate negative results.

The object of a pilot program is dissemination and the test of its effectiveness is the extent to which it provokes the development of similar programs. In another sense, a pilot program may be created to determine whether its materials, techniques or processes can accommodate to a new or different setting.

The final function, dissemination, refers to activities which assist people in finding what they are looking for and activities designed to inform professionals about improved practices in their respective fields. Dissemination activities are usually specific in the ordinary ways in which professionals seek, obtain and utilize information. Maybe the first

and most important dissemination project would be to find out how different categories of professionals seek, obtain, and utilize information about vocational education.

The second dimension of the structure deals with the instrumentalities of state and local programs of research. There are two of them--project support and program support. Both types are referred to in the 1968 Amendment to the Vocational Act.

Project support is time-defined. It has specific objectives, a specified outcome or a promise of conclusions, positive or negative. The project terminates at the end of the grant or contract period.

Programmatic support permits the choice of alternative strategies during the course of the program of inquiry. It allows the pursual of a line-of-inquiry as, for example, in research and development centers or a research-emphasis in institutional development.

The third dimension of the structure involves the administrative devices employed including the state plans, the local plans and the research coordinating unit plans. State plans are the official expression of State Boards after consultation with State Advisory Committees. They provide the overall map for the viewing and approving research project and program proposals from other agencies and institutions, including local agencies.

Local plans for research programs are contained within the applications for funds from local education agencies. These plans identify the research programs, activities, and services included among the projected needs of the local education agency. The plans of research coordinating units are likewise included within state plans. But research coordinating units are separately identified in the legislation as an administrative device serving special needs within each state.

The final aspect of the research structure is the research program categories or the program descriptors. These describe the substantive content of the research undertaken. No effort will be made here to provide a complete list. A few illustrations will suffice.

1. Educational levels--from pre-school to adult education (a priority in the Act).
2. Target groups--handicapped, gifted, unemployed, disadvantaged, the general student, etc. (a priority descriptor in the Act).
3. Curriculum Emphases--occupational clusters, academic disciplines, basic skills, work experience, etc. (a priority descriptor in the Act).
4. Educational functions--administration, supervision, teacher education, career planning, evaluation, educational planning, organization, instruction, etc. (a priority descriptor in the Act).
5. Demographic characteristics--urban, rural or suburban (a priority descriptor in the Act).
6. Educational Process characteristics--learning, motivation, values, policy studies, the role of socio-economic variables, etc.

The research program categories or program descriptors may exist singly or in combinations. Their usefulness, if any, is to serve as a catalog of possible priorities to consider or as a way of viewing the balance of research effort underway.

The Interface Relationships Between the Total State Program and the Local Program of Research

The state program as expressed in the State Plan should contain the most accurate and explicit statements of existing and future educational needs and desires. Specifically, this should be statements of what we wish to know (research) and what we wish to be able to do (development).

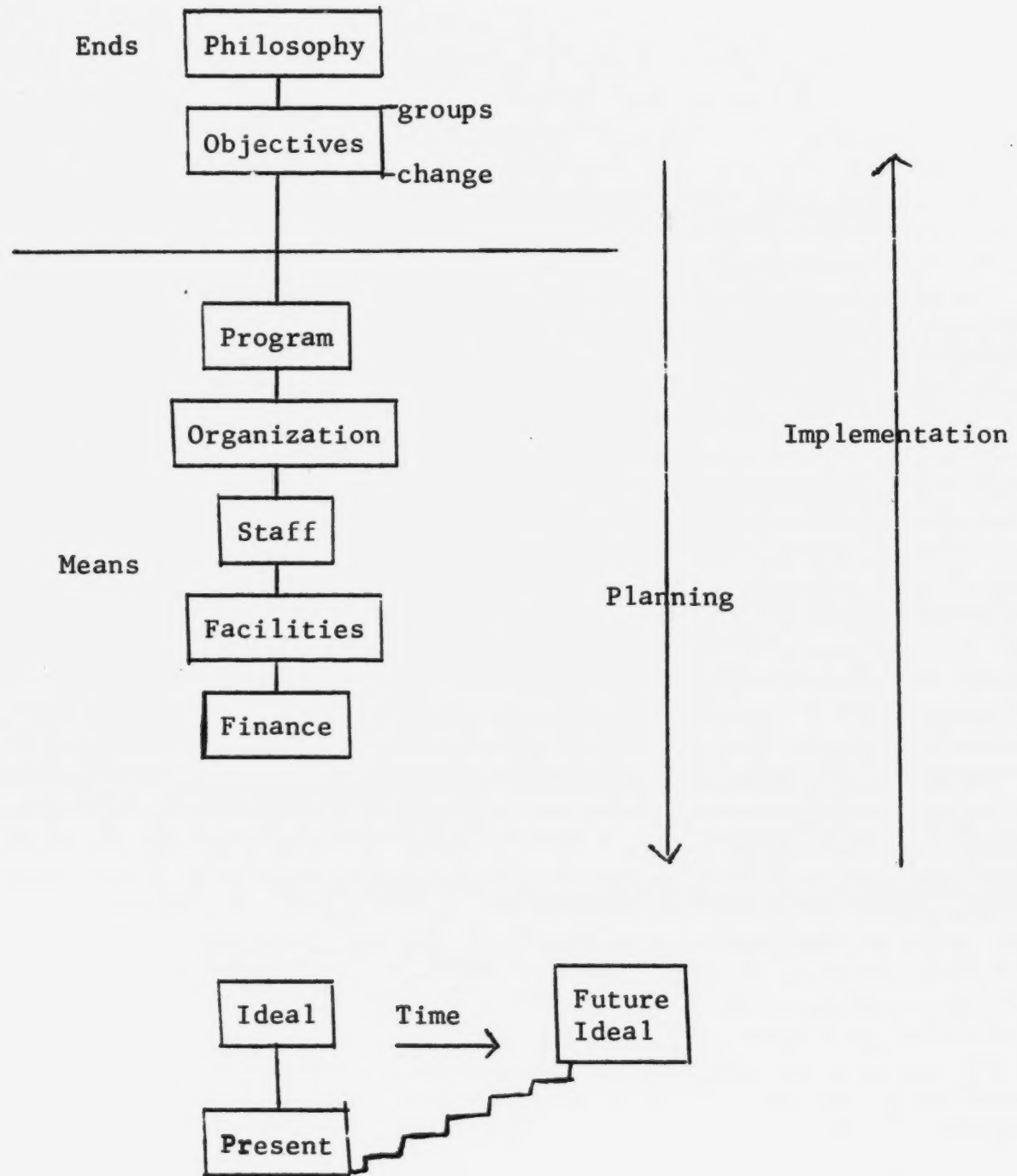
Secondly, it should contain the opportunity for alternative strategies and hypothesis for solutions to defined educational problems or priorities. It should not necessarily attempt the one best solution.

Thirdly, it should address itself to a decision-oriented planning process by evolving a five-year plan wherein this year's decisions are improved by projecting them over a five-year period and where the planner will be in the same relative position next year as he is in this year--he will have new data, new need statements, and new criteria for decisions which he has gathered in the intervening period, but he will still be projecting for a five-year period to improve this year's decision.

Some suggested guidelines for possible strategies are the following:

1. Establish a research commitment at both the state and local levels. Congress has been unanimous in their commitment (10%) in two successive acts. Its response requires a similar commitment from states and local agencies. It is incumbent on states and local agencies to similarly express a commitment as a percentage of program rather than a mere declaration of interest.
2. Place a program oriented research commitment in the State Plan and in the local plans which are included within local applications. It is the purpose of the state plan to describe a program orientation as well as a commitment.
3. Give early and continual attention to training for research and for planning.
4. Employ a variety of models for emphasizing various strategies for research and planning:

For example: (In the following diagram, each step depends upon the preceding step and one may move from the top or the bottom depending upon whether one is planning or implementing.)



*Most practitioners spend so much time implementing that they don't have time to plan.

5. Avoid suboptimization--the temptation to research subsystems without looking at the system as a whole or the effort to find better ways to do the things which should not be done at all!
6. Develop strategies for institutionalizing the research and development process. Institutionalizing the research and development process tends to build resources rather than deplete them. The biggest problem in this legislation will be personnel--State, University and RCU. The biggest mistake will be to assume that it can be done without a heavy investment in training!
7. Expand present mechanisms and create new ones, if necessary, to accomplish research, development and training. The 1963 Act produced Research Coordinating Units. The 1968 Amendment may require additional structural development to accomodate all of the needed research.
8. Establish a strategy for complementarity among the various research, development and training stimuli within each state. This may be an essential function of the Research Coordinating Units.
9. Encourage the production of research and development from as well as dissemination to the local education agencies. Local agencies should not assume that research is an activity to be done elsewhere. Local agencies may be active in all phases of research. In addition they have the additional responsibility to illuminate problems whose solutions may be found through research in other agencies, institutions or at other levels.
10. Finally it should be said that much of the responsibility for quality, quantity and momentum in vocational education research will hereafter be in the hands of state planners. The research thrust of vocational education will thus be guided by what is omitted from state and local plans as well as what is included!

Footnotes

1. Hornig, Donald F., "United States Science Policy: Its Health and Future Direction," Science, Vol. 163, No. 3867, February 7, 1969, p. 523-528.

STRATEGIES FOR TRANSLATION OF RESEARCH RESULTS INTO
CHANGE FACTORS IN REGULAR VOCATIONAL EDUCATION PROGRAMS

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You've all heard that theoretical problem the general science teacher proposed to his seventh grade class: If a tree fell in the middle of the forest and nobody was around, would there be any sound? The point is, it takes both a sender and a receiver to make sound. One without the other isn't much good--that is, if it's sound you want.

Similarly, it takes senders and receivers if we are going to have research. Is there really any research if it ends its life on a library shelf as an unpublished thesis, or if it impresses the researcher's colleagues but never leaves the ivory tower, or even if it gets on a microfiche and there rests forever in peace? At least we can say this for the tree in the forest--it was following a law of nature which provides for a constant cycle of life which begins with the seed and ends when the tree dies and falls. But there is no law of nature that says we should devote enormous amounts of human energy to research but fail to translate these research results for the improvement of vocational education. Rather, this is a tragic waste of human resources. It is a problem of particular concern to the educational research community.

Not all research is plagued by this communication gap between senders and receivers. Perhaps this is because 69 percent of the research and development work in 1969 will be performed by industry.¹ R and D expenditures in the United States, it is estimated, will amount to a staggering 25.9 billion dollars. For its part, industry can ill afford the luxury of pure research without benefit of some payoff. Industry views research as a product purchase. This may be a pragmatic view of R and D, but it's the payoff that counts. Colleges and universities, not-for-profit institutions, and the federal government account for that remaining 31 percent of R and D performance expenditures. It's a mighty vital 31 percent, too, for this business of educational research also promises a payoff. It has the potential of vastly changing and improving our education process. When this happens, education can play its key role of helping to shape a better society by helping man to improve himself. What a payoff this could be! What a shame to lose even one piece of this kind of research.

The problem, then, is to devise a plan or course of action that will move more educational research off the shelves and into our regular vocational education programs. To do this, we must identify the agents for change. How can we get more visibility for research on the local level; and more importantly, who will undertake this? It seems to me there are at least four important agents for change: (1) teacher training schools; (2) the community itself; (3) curriculum guides; and (4) commercial firms. Each has certain limitations. With your forbearance, I should like to briefly explore the change capabilities of the first three of these agents and to develop the potential capabilities of that fourth agent, the one I know best, in some depth.

The teacher education schools are perhaps the most suited to perform this role of change. The biggest obstacle here arises from the fact that the best basic research has not been done in the colleges of education, which one would consider to be the logical source of education research, but in the departments of psychology in universities--thus creating a communications barrier of some consequence. Happily, this condition has been somewhat alleviated in recent years as it has become respectable for other researchers to associate with their colleagues in the colleges of education. This fact alone could make teacher education a more effective change agent. The sole remaining barrier, if one were to exist, would originate with the professional staff who must constantly evaluate research and make critical decisions that could affect the curriculum. Decision-making can be risky, particularly when there are few if any of the other change agents at work to confirm these decisions. This leads me to conclude that we can look to teacher education schools for a limited amount of change stimulus, as we always have; but it will not of itself be the cutting edge of change.

To what extent can we count on the community to be an agent of change? This is the neglected one. To be sure, vocational educators have given the employer an advisory role, but has there been any real effort to translate industrial needs and industrial research into curriculum change? The whole purpose of industry's R and D effort is to produce a product. Therefore, the emphasis is more on the D than the R. The employer is simply not in the business of attempting to determine how people learn. Is it any wonder, then, that industry has had little influence in determining what people learn? A really effective advisory committee should have more such influence, but too often neither the employer nor the educator has any tangible criteria for such curriculum suggestions. If such criteria were more readily available, the employer could be a more effective change agent. As a part of the community, we have been slow to recognize the status of parents and students as agents for change. The student's participation in curriculum determination makes headlines today. Because we have been slow to recognize this change resource, we are now suffering through some excesses which forcibly call themselves to our attention. Parents, students, and recent graduates will surely be an increasingly militant change factor; but won't they also need some tangible criteria to back up their recommendations or demands? The providing of a complete behavioral analysis of jobs for the community is needed, and this is clearly the chief responsibility of educational research.

The curriculum guide is another agent for change, and a powerful one at that. When a local school system documents its beliefs with a written plan, there is change--or at least compliance. When the state or the USOE produces a suggested curriculum guide, the force has still more power. The value of these guides depends on how well the curriculum planners have done their homework. A vocational guide might be evaluated by seeking answers to questions such as these: (1) Have the major jobs and occupational areas been identified? (2) Is this identification accompanied by a description and analysis of the jobs, including the requisite social and background knowledges, and the behavioral skills?

(3) Has this analysis been translated to the curriculum in terms of materials development, performance standards, media techniques, and methodology? (4) Does the guide provide for realistic learning experiences in and out of school? This is a tall order. I have seen some guides which, when measured against these standards, would surely rate very high. The USOE guides for the Stenographic and Secretarial Occupations² are an example. But no matter how good the guide, nothing happens until the guide is implemented and learning takes place. Implementation requires both an understanding of the technology process and the necessary instructional materials to do the job. We are making some giant strides in developing performance goals. The NOBELS project³ is one of several efforts funded by the Center for Research and Leadership Development in Vocational and Technical Education for the express purpose of developing behavioral objectives for business and office education. Implementation also will take instructional materials which confirm the whole process of instructional technology. This is where that fourth agent for change--the commercial firm--can play a valuable supporting role.

The commercial firms are often the last to receive the word on the implications of educational research, and this is a shame, for they are in a key position to design and implement new learning systems. We can no longer afford to wait 20 years, the traditional time lag between the development of a research prototype and its implementation in the classroom. There must be better communication between the research groups and the commercial firms in the business of education. But it goes beyond this. The educational publisher must redefine his own role to determine how he can best serve as an effective agent for change--and, hopefully, with a reasonable expectation of making a profit in the process. This is no enviable job. It entails far more risk than most publishers care to admit, and it's small wonder that many educational publishers are unwilling or unable to invest their full resources in the educational technology that is now breaking upon us. Consider, for example, how the classroom of 1978 will look. These are some of the things Dave Bushnell has been telling us; therefore, they can hardly be classified as "visions":⁴

1. In 1978, the influence of technology will be such that the self-contained classroom featuring conventional modes of teacher/text-book centered instruction at a lock-step pace will be a characteristic of a minority of schools in this country. It will still be a large minority, but it will be declining.

2. By 1978, the majority of schools will demand systems of instructional materials which include precisely stated behavioral objectives, diagnostic tests of pre-instruction behavior, criterion-referenced tests of achievement, and instructional programs which are delivered through a variety of media, which engage the student actively, which permit him to progress at his own rate, and which are designed to generate in the learner a maximum of self-direction.

3. By 1978, the majority of schools will have independent study facilities equipped with audio and visual components. These will range

from sophisticated dial-access systems to simple combinations of tape recorder and projector. It is also likely that a versatile, low-cost easy-to-operate audio-visual device designed for self-instructional use will be used in significant numbers of these facilities.

4. By 1978, about 25 percent of the schools will have on-line use of computers for instructional purposes--drill, tutorial, simulations, problem-solving, and information retrieval.

5. By 1978, purveyors of instructional materials designed to fill the needs created by these changes in education will carry on substantial in-service teacher training programs.

6. By 1978, many schools will require evaluation data from the distributors of new instructional materials and equipment. These predictions imply many far-reaching changes in education.

Industry and Education

These predictions imply a close partnership between industry and education. Actually, this association is not exactly new. Critical decisions in education have often been made by the businesses associated with teaching and learning. In the simpler days, the textbook publishers were one of the local school's few business contacts. This was so because the publishers were among the few organizations with national outlooks at a time when almost all the decisions in education were made at the state and local level. Today, business firms have themselves become major institutions for education and training. A number of them have contracted to manage such public institutions as Job Corps centers; and more important to the present discussion, some of the effort to apply technology to education is being undertaken or at least paid for by industry.

Therefore, a careful examination of the so-called "knowledge industry," or "education business" may be instructive.

The education or learning companies are either independent publishers and film producers or else industrial firms that now have publishing subsidiaries. The independent companies generally fall into two categories:

1. First, small firms that deliberately eschew the risky and unfamiliar territory of educational technology and limit their efforts to the publication of good books, films, and other conventional materials of instruction, for which there will clearly continue to be a large demand and important place in teaching and learning. Since this is a business that can be started without a large amount of capital, the list of such firms 10 years from now will undoubtedly include some new names.

2. Second, much larger and more diversified publishing firms which have the resources to develop complex and sophisticated instructional systems, and even to acquire or build their own hardware capabilities as needed. Significantly, the companies in this category are among the strongest educational publishing firms; and it is no accident that they

have so far chosen to avoid being acquired by larger industrial firms. They include McGraw-Hill; Harcourt, Brace, and World; Prentice-Hall, (which had a brief engagement with RCA); Scott-Foresman; and Encyclopedia Britannica. As we shall suggest, there is at least as much chance that these companies will make significant contributions to educational technology as their industrial competitors will.

Then there are the publishing firms that have been absorbed by industrial firms--or to put it less parochially--the industrial giants which have picked up publishing bedfellows. They too differ greatly, and it is a mistake to lump them all together.

A Look at Capabilities

The fact is, it takes a lot more than an author and an editor to produce a vocational learning system. It takes a whole new array of resources to get into this game called educational technology. What are some of the capabilities required? The more obvious ones are:

- a. developmental research
- b. an understanding of behavioral psychology
- c. subject-matter competence
- d. equipment competence but machine independence
- e. broad marketing operations
- f. systems analysis experience
- g. money to invest over a long period of time

Good management is assumed.

Developmental Research: Strong research departments have been one of the strengths of many of the industrial firms that have entered the education business, while bona fide research has been notably absent in educational publishing. How important is it to the application of technology to vocational education? Our view is that pure research, which here would primarily be research in learning itself, need not be done by the business firms themselves, but that they must be prepared to do a great deal of developmental research towards the creation of specific products or systems--or to give it a less dignified designation, experimental product development. Given the objective of creating an innovative learning system, the early steps would include at least the following:

1. research in learning, on which new instructional strategies can be based;
2. experimental applications of this research in the form of methodologies, e.g., graded versus ungraded primary education, or other changes between the teacher and the learner;
3. experimental products to implement the experimental strategies, e.g., programmed books;
4. research to develop entirely new types of products, e.g., computers to apply programmed instruction;
5. subject-matter or skills analysis to determine the content of units of instruction, or what to teach when and in what sequence, to whom;

6. the production of models for field testing;
7. and evaluation under conditions that approximate the real world of education.

Of these seven steps, the first two and the fourth come closest to being true research. The first two are clearly the responsibility of educational researchers in universities and other non-profit organizations associated with education; and while more power to any business firm that undertakes them, this may not be the best allocation of resources for either education itself or the stockholders of the companies involved. The fourth could well be the responsibility of the university research groups, but in fact has largely been carried out by business firms. The most expensive research towards new types of educational products has been in the computer field, most of which has been done and paid for by the computer manufacturers, particularly IBM. (Consider, of course, who would have paid if computers for education had the same priority as jet engines for national defense.)

None of the other steps can realistically be called research. Instead, they are either basic decision-making to determine the scope and sequence of instruction (which is largely but not entirely the responsibility of educators), or else experimental product development and testing (which is largely but not entirely the responsibility of business). Thus, it appears that the capacity to do pure research is not of critical importance to the companies pursuing educational technology, but that the willingness and ability to experiment and test is critically important. Some firms have this ability to a greater degree than others, and some clues as to their relative abilities can be seen in the degree to which they have been willing to create new product lines that have the potential to make their own proven and successful product lines obsolete.

Behavioral Psychology: Behavioral psychology is increasingly the foundation of the process of educational technology, and it is unlikely that much significant work can be done without reference to it. The problem for the designers of instructional systems is not to conduct behavioral research but to apply its findings where they are applicable.⁵

Subject-Matter Competence: Subject-matter competence is necessary because development of skills and mastery of content are the ends of vocational education. Even in the creation of a fairly stable medium like a textbook, in-house subject-matter competence has been extremely important; and it is even more important in the creation of a new learning system in which individual components and the juxtaposition of components are innovative. During the early days of programmed instruction there were arguments about whether the best work would be done by programming experts who learned the subject matter or by subject-matter experts who learned programming. By and large, the latter won out; and they are even more likely to maintain their pre-eminence as several methodologies and instructional media are combined. This is not to suggest that the producers of instructional systems will not longer need the help of outside independent authors, but rather that the producer's side of the developmental group must have people who know in depth the structure of the skill or subject that the system is being designed to teach.

Equipment Competence: Equipment competence is important to the extent that equipment is an integral part of the instructional system and is not relatively standard. The various equipment technologies are not all alike in this respect. On the one hand, audio-visual technology is now so standardized that the producer of audio-visual materials of instruction need only know the technical characteristics of different kinds of equipment--and have good relations with their manufacturers. On the other hand, computer technology is so complex that the developer of computer-assisted systems of instruction either needs his own computer competence or else a close working relationship with one or more computer manufacturers. More importantly, the customer will require continuing service of both the equipment and the programs. Equally as important as a technical knowledge of equipment is an independence to choose the equipment that is most appropriate for the particular instructional task. One of the weaknesses of textbook publishers has been a tendency to depend exclusively on the printed page to help students accomplish specific learning or skills, and a potential pitfall for the computer-oriented companies will be to turn first to the computer to deliver a given unit of instruction. The best systems of instruction will be developed by the people who make equipment decisions late in the game, and make them without undue regard to what equipment they make in their own shops.

Broad Marketing Operations: The marketing of educational technology is more of an unknown than its development because so little has yet been sold. However, it seems likely that it will require at least three ingredients:

First, a sure knowledge of the educational community, primarily at the state and local level where almost all of the buying decisions are made. This is a particularly long suit of the educational publishers, and it's an important one because the education market is sprawling, complex, highly idiosyncratic, and often slow to respond.

Second, the marketing of instructional systems created through educational technology will take a major commitment to teacher-training. These systems will require teaching techniques with which most teachers are unfamiliar (and for which the schools of education are giving them little training), and the only way their producers will get them sold and used properly is to run thoroughly professional in-service training programs. This is an expensive proposition, as we have discovered who have done it on a large scale.

Third, it will require custom selling of the sort done routinely by computer manufacturers. Almost by definition, an instructional system will be tailored to the needs of the individual school system, even though it may be made up of off-the-shelf components.

Systems Analysis: This competency has been discussed at length in this commentary and therefore needs no further elaboration here. It is a competence that has critical importance and value, but no greater value than any other components mentioned here.

Money to Invest: Money will be required to produce the kind of capability we are discussing here. The development of sophisticated systems is a complex and expensive job and although the investment in absolute dollars is not great for many companies that have gambled on the manufacture of computers or television sets, it is large relative to the potential pay-off. Rates of profit are anybody's guess, but they are apt to be lower than for textbook publishing (8 to 9 percent after taxes). If so, they would be lower than the normal rates of profit for Xerox and IBM, but higher than those of RCA, Raytheon, and Westinghouse. Cash flow is apt to be poor in a business involving long-term investments, slow inventory turnover (schools buy once a year), and large receivable (schools being slow to pay). No quick-buck business, this. It helps, obviously, to have a large base of profitable business out of which to finance the new developments--like textbooks. It will also help to have the backing of sound vocational research and development. Let's take a look at the state of this art.

The Shortcomings of Research and Development

It goes almost without saying that the United States educational system needs a better mechanism for vocational research and development than it now has, and this conference can make a major contribution by proposing some new approaches. There is too little research, too much of it is of low quality, too little is relevant to the most serious problems of vocational education; and, in general, there is too little direct relationship between research and implementation.

Furthermore, there is great confusion about what constitutes research, development, or implementation.

The following is an incomplete list of the shortcomings of vocational R and D:

1. The amount of basic research is very small. By "basic" research we mean that research which is designed to add to an organized body of scientific knowledge and does not necessarily produce results of immediate practical use. It is the sort of research identified with Piaget, Bloom, Bruner, or Gagne.⁸ Compared with basic research in the physical sciences, for instance, it is far too limited.

2. Applied research, too, has been neglected. Much more of it is needed, and more of it should take place on a broader scale. What modest efforts have been made in recent years have tended to be fragmented into small projects. More experimentation on a scale comparable to, for example, the NOBELS Project should be a prime objective.

3. This so-called education business has done too little R and D work. It has done a great deal of experimental product development, often as a means of implementing research; but even this work could be done on a more rigorous basis. The education business has an R and D capacity that needs to be stimulated, both through the incentive of direct contracts and through the insistence of schools that products be properly evaluated.

From our vantage point, which is the design and development of instructional materials, we see a growing need for stronger theoretical bases, as well as applied techniques for dealing with the major factors of the instructional situation.

The three major factors with which the instructional designer must deal are:⁹

1. The nature of the subject-matter content;
2. The nature of the learner;
3. The nature of the learning environment.

The work done by Bloom and his colleagues on the taxonomy of educational objectives, and particularly the work done by Gagne on the analysis of learning tasks, have provided instructional designers with useful tools for analyzing subject matter.

What is needed now is a taxonomy of instructional strategy and media related to these taxonomies of learning tasks. Such a tool would help educators deal more rationally with the learning environment. It would, however, require the generation of substantial empirical data to serve as a base for the development of useful techniques.

We also need to improve our techniques of diagnosing individual learners. Our long standing emphasis on standardized norm-referenced measures of ability and achievement are not adequate for the kind of individualized instruction now emerging in our schools. We need to strengthen our skills in diagnosing student behavior before instruction in terms of both mastery of prerequisite skills and prior mastery of stated instructional objectives.

Beyond this, we need instruments that will begin to help us diagnose differences in learning style so that we can effectively use the taxonomies of learning tasks, strategies, and media in relation to the variations in the way different individuals learn different things.

Finally, there is a great need for broad experimentation with the techniques of cost-effectiveness or cost-benefit analysis in education. This will be increasingly true as we continue to individualize instruction and develop alternate instructional routes to accommodate differences in the way individuals learn. The useful application of these techniques to decision-making about instruction will provide educators with a badly needed tool for rational analysis of instructional problems.

It seems to us that these improvements in the technology of instruction will come about only with a broadened and deepened research and development effort. This conference can make a major contribution by stimulating a high level of research and development in these problem areas.

The Role of Industry

Now for some special pleading. We hope that this conference will consider the contributions that industry can make to education through applications of instructional technology. Despite the highly generalized assumption that industry has capabilities that can be used effectively in education, there has yet to be developed an acceptable rationale for its greater involvement; and this has inhibited both industry and education. The two key questions are: (a) how to use industry for educational R and D work; and (b) how to maintain quality control of educational products and services. Implicit in both is the protection of the public interest.

R and D Work by Industry: It is reasonable enough to assume that the so-called education industry has the capacity to do worthwhile R and D work in areas connected with teaching and learning. However, it should be noted that the industry itself is highly diversified; and as we have already noted, the capabilities found in one firm may be quite different from those found in another; likewise, there is a wide range of activities that make up the continuum from basic research in education to the development of practical applications. (It would be helpful to have a competent and thorough study of what capabilities exist in what kinds of organizations.) Nevertheless, a few generalizations can be made about the capacity of industry to do R and D work; and they will suffice to make some other points.

First, industry has very little capacity to do basic research; and we feel that this function should be left primarily (although not exclusively) to the universities and other research-oriented organizations. Basic research in education is mainly research in learning theory, and we have already suggested that there should be more of it.

On the other hand, there is considerable capacity in industry to do applied research; for example, in the area of instructional media as it relates to differences in individual learners and in subject-matter content, as noted earlier in this paper.

Third, industry clearly has the capacity to apply research findings to experimental product development. In fact, the chief contribution of industry to the improvement of teaching and learning comes through its ability to translate the findings of research and creative experiments into products and services that have wide application in education. This, then, is one of the chief strategies for the translation of research results into change factors in regular vocational education programs.

Fourth, industry has some capacity for developmental work in new techniques that may be useful in education, such as cost-benefit analysis and systems analysis.

Fifth, industry has begun to develop the capacity to do evaluation studies, an activity that is heavily dependent on research techniques, and about which we will have more to say.

Finally, industry generally has the capacity to supply management for research efforts.

As noted earlier, the education industry is highly diverse; and different companies are likely to have quite different capabilities for educational R and D work. The fact remains, however, that these capabilities do exist; and it is important that they be used to the best advantage of education.

There is no present mechanism through which the R and D capabilities of industry and the needs of education can be matched. The natural inclination of industry is to put its money where there appears to be the greatest market potential, but this is not always an area in great need of development. Essentially, the allocation of business resources is made according to the goals of the individual business firm which may or may not at a given moment be consistent with the goals of education. In this respect, the education industry behaves much like the consumer goods industry, making investment decisions based on analysis of market trends, buying practices, competitive moves, and internal capabilities. However, the educational market differs greatly from the consumer market, in that it is public rather than private, and that it helps to accomplish societal goals. That is, education as a market for goods and services exists only because the public has created it and has chosen to leave the production of goods and services to the private sector of the economy. Although schools are increasingly specific about what types of products they want to buy, they have only indirect control (through their buying decisions) over the characteristics of the products offered to them, and in common with other economic activities virtually none over the R and D decision made by their producers.

This arrangement is not inherently bad, but we should recognize that it is not likely to result in an optimum match between the needs of vocational education and the R and D capabilities of industry. In fact, it is almost certain to result in a time lag between the recognition of an educational need and the allocation of industrial R and D resources to the fulfillment of that need.

It seems to us that the interest of vocational education would be better served--and the interests of the education business protected--if there were some mechanism for enlisting the R and D resources of industry in greater accordance with the needs of education. On the one hand, a strong case can be made for the maintenance of a strong and independent private industry devoted to the development and sale of goods and services for education; but on the other hand, perhaps the educational community should have more say in the priorities of the business firms.

To make the matter more difficult, education itself is less than unified in its determination of objectives and goals. Because of the highly decentralized nature of education--looking at it from a national standpoint--there are few effective means of agreeing on priorities. To be sure, there is fairly general agreement on the broad critical needs, such as the improvement of urban education, the integration of the schools, and so on; but general agreement on areas that have become

critical is very different from the development of discrete goals that have the potential to make significant improvements in education. It is difficult to build an R and D program around such a generalized goal as improved urban education, just as it would be difficult to build R and D programs in the defense area around a generalized goal like preventing World War III.

We need, therefore, a means of analyzing the needs of vocational education on a systematic and national basis; and then of influencing the allocation of R and D resources according to these needs, whether the resources are in education itself, in non-profit research organizations, or in industry. Further, whatever mechanism is developed for this purpose, it needs to be structured in such a way that the independence of local or state educational units is not jeopardized.

This last, it seems to us, makes it difficult for the Office of Education to be the main arbiter of educational priorities. Even if the Office could be staffed in such a way that it clearly had the competence to do the job, it seems neither likely nor proper to us that the Congress should place this responsibility solely in the hands of a powerful agency of the federal government; and there is clearly a reluctance among state and local educational officials to see much more authority given to the Office.

Therefore, we believe that some new mechanism needs to be created. If an agency were created for the purpose of influencing and contributing to the R and D work done in vocational education, if it were adequately financed and received its support from both the federal government and the private foundations, and if it were governed by a prestigious board of directors chosen on a basis that assured its independence, then we believe this agency could do much to match the educational R and D resources of the country to our long-term vocational education needs.

Returning to the matter of R and D in the education business, such an agency could also be the vehicle through which R and D contracts could be made with private industry, since such arrangements would be consistent with an analysis of what resources are applicable to what problems, and because they would avoid the difficulties of direct contracts between federal agencies and private industry in the area of education. (The sensitivity of Congress and the various federal agencies to the matter of R and D contracts with industry strikes us as highly naive as to the intentions of the business community, but we see no sign that it is likely to change.)

Dissemination by Industry: The power of the education industry to disseminate new applications of R and D work in vocational education is very great, and in fact remains the chief means by which new techniques for teaching and learning reach the teachers and students. Properly used, this dissemination or marketing capability can make an important contribution to education. The problem is to influence it without controlling it.

Schools, colleges, and other educational institutions are entirely free to buy whatever teaching and learning systems they consider best

suited to their particular needs (subject only to the limitations of local economics and occasional forms of local censorship), and any attempt by a national agency to influence or control these local buying decisions would clearly be a violation of our policy of state and local responsibility for public education. Therefore, it may be more effective to influence the sellers than the buyers; and we suggest that this can be done through the development of standards for both the development and representation of educational products.

The need for standards was not so great when the choice of teaching/learning materials was limited largely to textbooks. All teachers have used textbooks as students and taught from them as teachers and have a generally adequate frame of reference with which to make wise selections. However, the development of newer and less conventional forms of teaching and learning materials and systems presents teachers and schools with the problem of making choices without adequate frames of reference. Teachers who know what to look for in textbooks find it difficult to evaluate programmed materials, and even more difficult to decide whether or not equipment-based learning systems are appropriate to the needs of their students.¹⁰ Thus, the development of the new instructional technology carries with it the growing need to help educators make wise purchasing decisions.

We feel that the best solution to this problem is for the producers of educational materials and systems to develop standards for the evaluation of their products, and for educational institutions to insist on being given the data derived from field testing. Ideally, each new instructional program should be designed around a carefully developed set of behavioral objectives--that is, what learning it should facilitate for what kinds of students, and under what conditions--and then tested in actual classrooms during its formative stages in order to measure its effectiveness and to determine how it can be improved. Then the detailed statement of behavioral objectives and the field-testing data should be written up in a technical manual.¹¹ The manual would help potential users determine how closely the objectives of the program match those of the school and students for which it is being considered, and the data would provide reasonable evidence as to its effectiveness under specified conditions. Technical information of this type is commonly provided by the publishers of standardized educational tests, and there is no reason why it cannot be supplied by producers of instructional systems. Some, in fact, are beginning to do so; and it is the firm intention of McGraw-Hill to publish evaluative data for new programs with increasing consistency.

This approach to evaluation would help the producers to maintain quality control and the schools to make intelligent buying decisions. Further, because it would be a form of self-policing, it would leave both educational companies and schools with a maximum of independence. It would avoid the pitfalls of using some central agency to monitor either the production of instructional systems or the purchasing decisions made in education.

However, it is unlikely that this ideal state of things will be reached in the near future. The cost of evaluation is sufficiently high that education companies may be slow to undertake it on the scale suggested here, and the technical problems of evaluation are probably beyond the present competence of all but the most sophisticated producers of instructional systems. Therefore, it would be highly beneficial if some combination of both pressure and assistance could be applied to the problem; and we see this as another highly useful function of this conference.

With the help of the RCU, two essential services in the area of evaluation could be performed. These services would greatly help in the gathering of evaluative data without seriously limiting the freedom of action of either the education companies or the schools and colleges. The first would be to undertake studies of the process of evaluation itself, in order to provide the producers with some technical assistance that they badly need. The second would be to show schools and colleges how to interpret evaluative data; and more important, how to determine their own instructional objectives with enough sophistication to create a framework within which to consider the new instructional systems being offered to them. Both services would apply indirect pressure on the companies and schools to get on with the job, and at the same time would help them do it.

Conclusion

These, then, are some of the ways in which I think instruction itself will change, the education industry will change, and the relationships between education and industry will change. The last of these--the relationships between education and industry--represent a tremendous challenge because they involve the delicate balance between public and private goals.

Educational technology--at least if you define it as the process of systematically designing instructional strategies--has great potential to improve education. Part of this capability exists in industry, and ways must be found to use it to serve the best interests of education. From the standpoint of national policy, therefore, it would seem to me highly advisable to foster a climate in which the maximum resources will be allocated to the improvement of education by all of the segments of society that can make a significant contribution, including the various parts of education itself, the major government units at the federal, state, and local levels, the non-profit R and D organizations, and the business community associated with education.

Research in the design of instruction and its implementation in the classroom, however, must be done in the delicate political climate that pervades education. While virtually all of public elementary and secondary education is controlled at the state and local level, it makes little sense for R and D work in instructional design to be done for purely local purposes. This makes educational R and D more difficult to administer than, for instance, defense R and D, and considerably more sensitive politically.

Speaking for my own interests, I believe that the education companies are capable of playing a major role in both the design of instruction through R and D work (more D than R), and in the implementation of instructional innovation through dissemination to the schools. I recognize, of course, that our business is the private sector of a public enterprise and that greater involvement will mean more subordination to public control. The problem will be to devise relationships between education and industry that provide the greatest natural incentive to work for the public good.

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STRATEGIES FOR DEVELOPING MODEL ANNUAL AND LONG-RANGE PROGRAM
PLANS FOR "RESEARCH" AT STATE AND LOCAL LEVELS

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The purpose of this paper is to present ideas that may be helpful in developing long-range and annual plans for "research" in your state. It will (a) discuss the kinds of information that should be included in the plans, (b) suggest some general principles for making the substantive decisions required, and (c) provide a few examples based upon the particular situation in Minnesota.

The ideas presented are not restricted by or necessarily tailored to the 1968 Vocational Amendments, but the Amendments, with proper interpretation, can facilitate the ideas.

Many of you have undoubtedly given considerable attention to the topic of this paper and have reached some tentative conclusions of your own. Consider this presentation food for additional thought which, hopefully, will engender a lively discussion and will ultimately result in closer concensus and more efficient plans for all of us.

The following is an outline of the paper:

- I. Long-Range Planning
 - A. The Role and Functions of "Research"
 - B. Activities of a Research-Related Subsystem
 - C. Organizational and Administrative Arrangements
 1. The State Level
 2. The Local Level
 3. Coordinating Mechanisms
 - D. Sources of Research-Related Funds
- II. Annual Planning
 - A. Funding Research-Related Organizations vs. Individual Projects
 - B. Determining Activity Priorities
 - C. Program Budgeting
 1. Organizational Budgets
 2. Individual Projects
- III. Some Implications of the Proposed Subsystem
 - A. Federal Regulations
 - B. Evaluation of the Research Subsystem
- IV. Summary

I. Long-Range Planning

A. The Role and Functions of "Research"

The most dynamic and productive sectors of our society have long been based on continuing sources of new knowledge and means for speedy conversion of that knowledge to practical uses. But this hardly characterizes education! The American school must be better organized for innovation and change. The generation of new ideas, methods of determining what is useful, and accelerating the adoption of proven ideas may well be the greatest need of all in our education system.

What is required is a formalized subsystem of the occupational education system designed to facilitate educational improvement by carrying out certain "research-related" activities. The input of such a research-related subsystem would be educational problems, like discrepancies between (a) information needed and information available, (b) educational inputs and educational outputs, (c) existing knowledge and existing practice, (d) social values and social realities, and (e) relative position today and creating the future we would like.¹ The output of the subsystem would be accurate information, proven knowledge, and effective products which are readily available to educators as a resource for increasing the rationality of their decisions, and thus for improving the efficiency of the total occupational education system and its outputs.

This paper, therefore, does not perceive of "research" in a narrow project-oriented sense, but rather in its most generic sense--as a functioning subsystem designed to serve the complete occupational education system by carrying out a wide variety of research-related activities. The subsystem derives its problem inputs from the operating, information, planning, and management subsystems. In one sense, the research-related subsystem can be considered a device for handling the special informational, problem-solving, and dissemination requirements of the total system that can't be handled by the routine functioning of the operating, management, planning, and information subsystems. The role envisioned for "research" is essentially one of continuous service, but the subsystem must be organized internally to handle a wide variety of long- and short-range tasks on a high quality "custom production" basis.

The functions to be performed by a subsystem designed to facilitate change and improvement in occupational education may be considered the major purposes or broad objectives of the subsystem, but they are purposes that can never be fully satisfied, or objectives that can never be completely attained. The functions may also be thought of as ways to classify the kinds of goal-directed activities that are needed to carry out the role of the subsystem. In either case, functions provide a convenient device to help think about the important problems of organization and activities of the subsystem.

Several theories and models have been proposed in the last few years which are intended to explain the nature of the activities required to help insure rapid, qualitative improvements in education. Figure 1, "Educational Change Model",² illustrates one version of a generalized abstraction of the change process; it draws heavily upon the prior work of Guba and Clark.³ Figure 1 has been used as the major resource for identifying the kinds of functions to be performed by the research-related subsystem. The suggested functions are briefly described below. Each is required in order to facilitate change by exploiting the creative potential of individuals and groups, and by serving directly the on-going needs of the occupational education system.

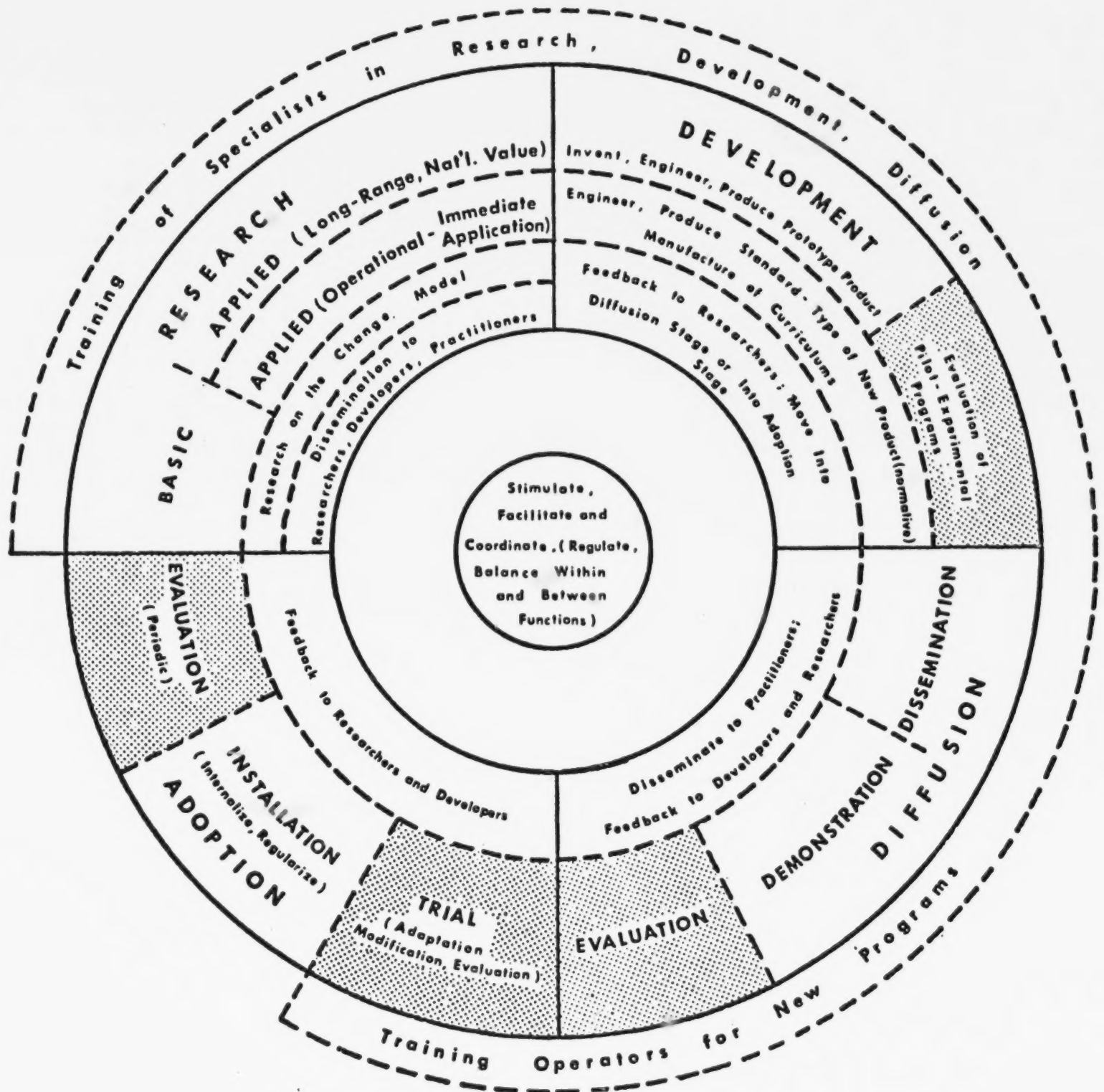
1. Conducting operational (applied) research to provide special information immediately useful in decision-making or knowledge immediately applicable in the operating program.
2. Developing new and updating existing curriculums and instructional materials to increase the scope and improve the relevance and efficiency of occupational programs (the "normative" development process of engineering and producing "standard" types of curriculum products).
3. Evaluating the effectiveness of occupational education programs including (a) the extent to which certain pilot-experimental programs are attaining their goals (formative evaluation), (b) the cost/effectiveness of alternative ways of providing occupational instruction (periodic, summative evaluation at the micro level), and (c) the total impact of the occupational education program in relation to societal needs and goals (periodic, summative evaluation at the macro level)
4. Stimulating, facilitating and coordinating the innovative research and development efforts of individuals and groups.
5. Inventing, engineering, producing, and evaluating prototype innovative curriculums and instructional materials.
6. Conducting applied research on methodological, continuing, and complex problems which have potential for making long-range and general qualitative improvements in occupational education.
7. Administering research-related grants and contracts with agencies and institutions in order to monitor and supervise the ongoing research-related activities supported by state-controlled funds.
8. Disseminating the results of research-related activities to (a) facilitate further research and development, (b) improve the rationality of educational decision-making, and (c) speed the application of new knowledge and the adoption of worthy innovative practices.
9. Coordinating and conducting training activities designed to increase the number and improve the competence of producers and consumers of occupational education research-related activities.

It should be noted that the suggested functions deliberately exclude the conduct of basic research. That is, all the problems to be researched by the subsystem should emanate from the parent occupational education system, and the results should have recognizable potential applications to that system. Demonstration, trial and adoption, as shown in Figure 1,

Figure 1

EDUCATIONAL CHANGE MODEL

(Read Clockwise)



represent the transitional stages which link the research-related subsystem with the operational subsystem.

All of the nine functions in the above list are necessary to the systematic improvement of occupational education practice. The research-related subsystem expressed in each state's long-range plan must provide for the efficient performance of all nine functions. And the implementation of the long-range plan, as revealed by the activities and budget of the annual plan, must give them substance under specific conditions.

B. Activities of a Research-Related Subsystem

A listing of specific activities to be performed within the research-related system would be worse than worthless--it could be completely misleading. On the other hand, a brief description of the general nature of the activities associated with each function can serve to clarify the meaning of the function. Even more importantly, a brief description of activities can indicate whether they warrant regular continuing attention from at least some designated personnel, or whether they may best be conducted on an irregular basis by the vocational community-at-large. Similarly, the nature of the activities can help provide clues to the most appropriate organization and administration for those that should be institutionalized. Consequently, such a description of activities, which attempts to hue to the elusive borderline between unnecessary explication and inadequate explanation, follows:

1. The conduct of operational research in the foreseeable future will require the continuous activity of designated persons in the collection of special information needed for planning or managing occupational education programs. For example, state-wide surveys may be required to determine the demand for some special occupational skills (assuming the information is not available through the regular Department of Labor reporting system). The information gap is so great at present that many individuals in the vocational community will probably have to be called upon at irregular intervals to supplement the efforts of designated personnel. Perhaps the most pressing current operational research need in most states is the development of an information system which will regularly gather and consolidate the data required by the several education management levels in the state.
2. Normative development activities begin after the need for a new, updated or otherwise improved curriculum has been documented (usually by other subsystems, like information, operations, planning or evaluation). The developers attack the qualitative problems involved using a standardized procedure to produce materials, to evaluate them in the formative process, and to transmit the revised product to operations and/or evaluation for adoption or further testing. The problem of dissemination and implementation rarely arises after normative development since the need for the product emanates from the operating program and is a direct response to that recognized need. In certain cases, education management may even decide to require

the implementation of the product, or perhaps to alter the incentive system to make adoption particularly attractive. There is little question that there is sufficient need within every state to expand and improve occupational education programs in a coordinated manner to justify the employment of development specialists at the state level; this is not meant to exclude the involvement of local personnel.

3. The critical need in program evaluation is the development or procedures for making periodic summative evaluations of (a) the cost/effectiveness of alternative ways of providing occupational education, and (b) the extent to which the state-wide program is meeting the total requirements of individuals, groups, and the labor market in the state. These procedures, requiring such data as program outcomes, students' characteristics, program characteristics, program costs, and labor market conditions must eventually be intergrated with the regular information subsystem in the state. In addition to the creation, continuous monitoring, and improvement of periodic evaluation procedures, evaluation specialists will be required to assess some of the products of normative development and most of the innovative products yielded by projects conducted all over the state. The information produced by evaluation will be distributed to researchers and developers as well as to educational planners. All of these important activities cannot be left solely to the voluntary, sporadic efforts of undesigned members of the vocational community. Specialists must be assigned to the evaluative task.
4. Stimulation, facilitation and coordination activities are designed to mobilize and direct the creative energies of persons interested in engaging in long- and short-range innovative research and development. The activities would include (a) maintaining an inventory of human resources for research, (b) providing information to potential researchers about means for obtaining research and development funds, (c) offering technical consultation and other types of assistance, (d) establishing priorities for problems needing to be researched, and (e) reviewing proposals and forwarding them to the proper authority for approval. There is a permanent need for these research services, which are best provided by individuals who have been given specific responsibility for them.
- 5,6. Innovative development and applied research (long-range) activities are the life blood of a dynamic occupational education system. It is through the conduct of creative research and innovative developmental projects that new knowledge and fresh, improved educational products are made available to the operating program. It is through these kinds of efforts that persistent and complex problems are solved and the quality of operating programs greatly improved. Therefore, individual projects and coordinated series of projects (programs) should be encouraged in such critical problem areas as (a) the methodology of curriculum development, (b) the formation of statewide manpower policies, (c) the relative efficiency of various organizational structures for providing occupational education,

(d) building curriculums for the disadvantaged, (e) teacher education processes, (f) student selection procedures and devices, and so forth. Unlike the preceding functions, sole or major responsibility for innovative and creative research and development activities should not be delegated to specific individuals; on the contrary, they should be undertaken by as many people with as diverse ideas as possible. Under some conditions, however, such as when (a) the supply of competent and interested talent is limited or concentrated, (b) it is necessary to insure a minimum level of activity, or (c) when research and development activities can be integrated with the activities of other functions for mutual reinforcement, it may prove to be economically and productively efficient to support the continuing innovative development and applied research efforts of designated individuals or groups.

7. Research administration is required to supervise ongoing research-related activities supported by state-controlled funds. The need to engage a wide variety of individuals on an irregular basis (as well as designated persons on a regular basis) in the activities of operational research, normative development, innovative development, applied research (long-range), and possibly program evaluation has already been pointed out. The importance of providing a procedure to stimulate and review the ideas of these people for possible fund support has also been noted. Thus, after individual proposals have been stimulated, reviewed and approved, it becomes essential to provide some central mechanism for monitoring supported projects to insure that the activities contracted for are conducted.
8. Dissemination includes the activities necessary to the collection of research-related information and its distribution to those who ask for it, as well as to those who should have it. It provides specialized communication linkages (a) between states, (b) among individuals and organizations within states, (c) between occupational education and the rest of education, (d) between the producers and the consumers of research, and (e) among the producers of research. Dissemination permits those engaged in research and development to remain at the cutting-edge of knowledge, and it makes that knowledge and its products known to those that can apply it. Dissemination is, therefore, an indispensable part of the research-related subsystem, and should include such illustrative activities as (a) maintaining a research library, (b) publishing and distributing analyses and syntheses of research, (c) coordinating with the ERIC system, and (d) promoting and publicizing demonstration projects of exemplary programs.
9. Research training to the highest levels of technical competence is essential to the long-range improvement of occupational education. We cannot push back the frontiers of knowledge without properly trained people. Further, states cannot depend upon the sporadic efforts of researchers who temporarily direct their attention to the field; states must have available highly competent people with a career commitment to solving the problems

of occupational education. Without such human resources individual states and communities will not even be in a position to compete for much of the occupational research funds available to them at the national level. The development of research literacy among consumers is equally important. Research literacy helps build psychological readiness for educational change and develops an understanding of the standards under which change should be made. Research training activities, therefore, must cover the gamut of advanced degree programs for research specialists, through institutes, seminars and workshops, to the publication of introductory instructional materials. Highly trained research and development personnel are in short supply. Since they are essential to the success of the research-related subsystem, and since the capability for training these specialists is presently limited, special attention must be given to utilizing and strengthening the capability where it now exists. The involvement of a great many institutions is not necessary, but the quality of those involved is critical.

Thus, with the possible exception in some states of the innovative development and applied research (long-range) functions, the nature of the activities of all the other functions require that persons or institutions be designated to assume responsibility for their continuing conduct. This, of course, is not meant to imply that all the activities of those functions are to be performed by specified personnel, but only that some minimum level of continuing, coordinated activity is required and must be assured to maintain an effective output from the research-related subsystem, and to efficiently mobilize and direct the creative resources that exist within each state.

C. Organizational and Administrative Arrangements

The organizational and administrative arrangements adopted by each state will be the mechanisms it feels can best facilitate the efficient operation of its research-related subsystem within the context of existing circumstances. It is not possible, in this presentation, to take into account all the relevant conditions operating in every state. Instead, an attempt will be made to indicate some general principles for organization and administration, and to utilize Minnesota to provide an occasional example of their application.

It is convenient to think about organizational problems in terms of the state level, the local level, and the need for providing coordinating mechanisms. The presentation is, therefore, arranged in that manner.

1. The State Level--The preceding material on the activities of research-related functions revealed that (a) the conduct of most, if not all, of the activities would require the continuous assignment of specific persons, but that (b) many of the activities also demanded the widespread but intermittent involvement of other persons throughout the state.

The operation of the research-related subsystem is primarily a state-level responsibility; each state must organize itself to provide for whatever continuing activities and coordination are demanded by the subsystem. This means that individuals or agencies who are given specific continuing assignments in the subsystem should be considered a part of the state-level organization.

What particular organizational and administrative arrangements at the state level, then, can best facilitate the efforts of these specialists? Which functions (activities) seem most homogeneous and mutually reinforcing? Which functions would benefit most from a close association with the operating program, and which would prosper from a less restrictive environment? These seem to be the key questions in determining an appropriate organizational structure.

The activities involved in operational research and normative development (of curriculums and instructional materials) can profitably be conducted by the same individuals. In addition, the inputs and outputs of these functions must be very closely linked to the planning, operations, and management subsystems. Consequently, the operational research and normative development functions should, in most states, be assigned to the vocational division of the State Department of Education, where they can be closely coordinated with the needs of state and local administrative and supervisory personnel.

The evaluation function also directly serves the operating program as a major source of information for making planning and management decisions. Evaluation must also work continuously and cooperatively with normative curriculum development since the output of one typically provides the principal input for the other. Therefore, the evaluation function should also be assigned to the vocational division of the State Department of Education. But in order to retain some essential independence between the developers and evaluators of occupational programs, the two functions should be kept relatively autonomous while retaining both under the direct supervision of the chief state vocational officer.

Since the State Board for Vocational Education is fiscally responsible for the expenditure of federal and state funds for research-related activities, special staff in the vocational division of the State Department of Education should be charged with responsibility for administering and supervising individual research-related project grants and contracts made with agencies and institutions in the state.

To illustrate one application of the above ideas, Minnesota operates a Program Planning and Development Section in its Vocational Division; The Director of the Section reports directly to the Assistant Commissioner for Vocational Education.

The Section functions include operational research, normative development, and research administration. In addition (but not considered a part of the research-related subsystem per se), the Section engages in planning and budgeting activities, thus tying the research-related functions and planning very closely together. At the same time, a separate Evaluation Section operates, with its own Director reporting to the Assistant Commissioner. Finally, to complete the State Department picture, there are also two operational sections whose Directors report to the Assistant Commissioner, thereby providing high level linkages among certain research-related functions, planning and budgeting, operations, and management.

The remaining research-related functions, including (a) stimulation, facilitation and coordination of innovative research and development, (b) dissemination, and (c) research training should, in our opinion, be performed in an environment which is reasonably removed from the urgency and directiveness which necessarily characterizes state departments of education. An environment is desired which encourages receptiveness of new ideas, and provides a maximum of opportunities for exposure to them; an environment which offers ready access to varied sources of information, instructional opportunities, and research expertise and facilities in all the occupational as well as related fields. This description is more typical of the traditions, values and activities of institutions of higher learning. And, as is the case in some states where research competence is limited or centered in one institution, the above functions can be profitably combined with the conduct of some innovative research and development to comprise an internally compatible, mutually reinforcing and economical set of activities.

Plans in Minnesota call for operating a Research Coordinating Unit as a part of a Division of Vocational and Technical Education in the College of Education, University of Minnesota. The Unit will have statewide responsibility for stimulation, facilitation and coordination, for dissemination, for research training, and for conducting some research and development activities with potential long-range applications.

Table 1 summarizes much of the foregoing material by listing the nine proposed research-related functions, indicating which should be assigned to specific personnel for the conduct of some of their activities, and showing the preferred organizational location at the state level for each function.

2. The Local Level--At present, local or area vocational schools should not attempt to establish permanent, formal research structures by employing specialized personnel and assigning them to carry out continuing research-related tasks. The statement, of course, is not necessarily applicable to large city school systems, nor to small systems ten years from now. This is not to imply that local school personnel should not

Table 1
ORGANIZATION OF RESEARCH-RELATED FUNCTIONS

Function	Designated Responsibility Desirable	Preferred Organizational Locations	
		State Department	College, Univ.
a. Operational Research	*	*	
b. Normative Development	*	*	
c. Program Evaluation	*	*	
d. Stimulation, Facilitation, Coordination	*		*
e. Innovative Development	?		?
f. Applied Research (long-range)	?		?
g. Research Administration	*	*	
h. Dissemination	*		*
i. Research Training	*		*

presently be very actively engaged, on a temporary and irregular basis, in research-related activities, either in separate projects or programs, alone or in consortium with other local schools, or in cooperation with state-level personnel. In fact, local activity is essential to the operation of the statewide research-related subsystem, and is probably critical to the professional development of the individuals involved. Research and curriculum development can be major vehicles for in-service education.

It is recommended, therefore, that every local school with occupational programs build a budget with sufficient contingency resources, in dollars and in time of staff, to encourage the creative research and development efforts of its faculty and to make it possible for them to utilize additional support available from the state. Local resources (time) will also be needed to permit school personnel to actively cooperate with the state in the conduct of larger evaluative, developmental, and research undertakings. Last, but certainly not least, every local school should make known to the state that it will request, and expect to receive, certain research services, such as technical consultation,

dissemination, and research training, and that its faculty will want a voice in determining the priorities of research and development activities to be conducted in the state.

All of the activities, noted and implied above, have important payoffs: the direct product of the project, growth in the professional competence of staff, and the formation of attitudes that will permit acceptance of change on a rational basis.

3. Coordinating Mechanisms--Several linkages, principally those with the other subsystems of occupational education, have already been identified, but many more are required to properly articulate the activities of the research-related subsystem at different levels, and also to coordinate them with the ongoing activities in the non-occupational aspects of education. Consequently, coordinating mechanisms should be provided (a) at the state level, (b) between the state and local levels, and (c) between the state, regional and federal levels.

At the state level, coordination is required between the State Department of Education's research-related activities and those conducted at a college or university unit, and between them and the rest of the state's educational research and development activities. The State Department and the university units can readily interrelate their efforts through some joint appointments and the preparation of a single annual plan for research-related activities. Coordination with other educational efforts in the state can be achieved through the administrative structure of the State Department of Education and by one or more advisory committees. The committees could bring together much of the leadership in the state directly concerned with the problems and conduct of occupational education, with secondary and higher education in general, with occupational and educational research, and with statewide planning for human resource development.

The principal means for coordinating state and local level efforts should be through the operation of a Review Committee. A portion of the funds available to the State Board for Vocational Education for conducting research-related activities should be used to partially support specific solicited and unsolicited projects submitted by public or private agencies, organizations, and institutions. The designated Research Coordinating Unit, as an activity of its stimulation - facilitation - coordination function, should form a Review Committee to review, and make recommendations about, all individual research-related proposals requesting state funds, or being forwarded to the Commissioner, U.S. Office of Education, through the State Board. The Review Committee would base its recommendations upon the soundness of each proposal, its economic efficiency, and its educational significance as determined by a priority list of activities needed in the state.⁴ Membership on the Review Committee might include representatives from such organizations as the State Department

of Education, the Research Coordinating Unit, local vocational schools, the state planning agency for human resources, and so forth; special readers might also be employed for their particular technical and/or substantive knowledge relevant to each proposal. The chief state vocational officer, after taking into consideration the recommendation of the Review Committee should make the final decision about whether or not to approve all research-related proposals requesting state funds or being forwarded to the U.S. Office of Education. Proposals for individual research-related projects may be solicited by the Research Coordinating Unit, in light of established statewide priorities, or directly by the chief vocational officer in light of his perception of immediate needs. The procedure for reviewing and recommending solicited and unsolicited research-related projects should be the same, although the process may be speeded in the case of solicited proposals.

Finally, coordination between the state and the regional and federal levels can be accomplished through several means. Research Coordinating Units have already begun to organize their own regional associations and to develop relationships with the regional educational laboratories and USOE regional offices in their areas. Similarly, the Research Coordinating Units have created an informal national organization and have worked harmoniously with both the national vocational research centers and the Division of Comprehensive and Vocational Education Research, Bureau of Research, USOE. State Departments of Education have long since developed good rapport with the Division of Vocational-Technical Education in the USOE. This dual relationship with the USOE should be retained since the range of research-related functions being proposed are the legitimate concern of both federal Divisions. The relationships can be strengthened to everyone's advantage provided the same cooperative relationships are developed at the federal level as are envisioned in this paper at the state level.

D. Sources of Research-Related Funds

The discussion of funding sources will be limited to the Vocational Education Amendments of 1968, but they will not be restricted to Part C, Research and Training in Vocational Education. The scope of research-related functions and the manner in which the Act is organized require that all Parts be combed to abstract those that are relevant. It is important that all applicable resources be placed at the disposal of the research-related subsystem so that all pertinent activities can be coordinated, in the interest of the total occupational education program, rather than fragmented and dissipated in unrelated efforts.

Further, forthcoming interpretations of the Act should make clear that all funds from Section 131(b) used to support personnel, indirect, and general operating expenses for the conduct of legitimate continuing research-related activities can be reimbursed at the 75 per cent rate.

This should be the case even if those activities are being conducted at more than one place, or under labels other than "Research Coordinating Unit". On the other hand, expenditures from Section 131(b) which are associated with the conduct of specific identifiable projects should be reimbursed at a 90 per cent rate, even if conducted by the unit labeled "Research Coordinating".

As a final general consideration of funding sources in the Act, it is noteworthy to distinguish between continuing and terminal sources. The former provide a more satisfactory base for employing staff to carry out continuing research-related activities. Terminal funds are more suitable for the support of specific solicited and unsolicited projects.

A search of the Amendments revealed the following relevant sources of continuing funds available at the state level: Section 122(b) 2 and 3 deals with evaluation and with obtaining information about current and projected manpower needs and job opportunities; Section 122(a) 8 is concerned with evaluation and development activities as a part of ancillary services; and, of course, Section 131(b) provides authorization for all types of research-related activities.

The state will also have under its control terminal funds authorized by the following sections: Section 142(d) supports the development, establishment, and operation of exemplary and innovative occupational education programs and projects; Section 161(b) 2 includes curriculum development, evaluation, and research and demonstration activities in homemaking education; and Section 173(a) 4 and 8 provides for curriculum development and evaluation in cooperative programs.

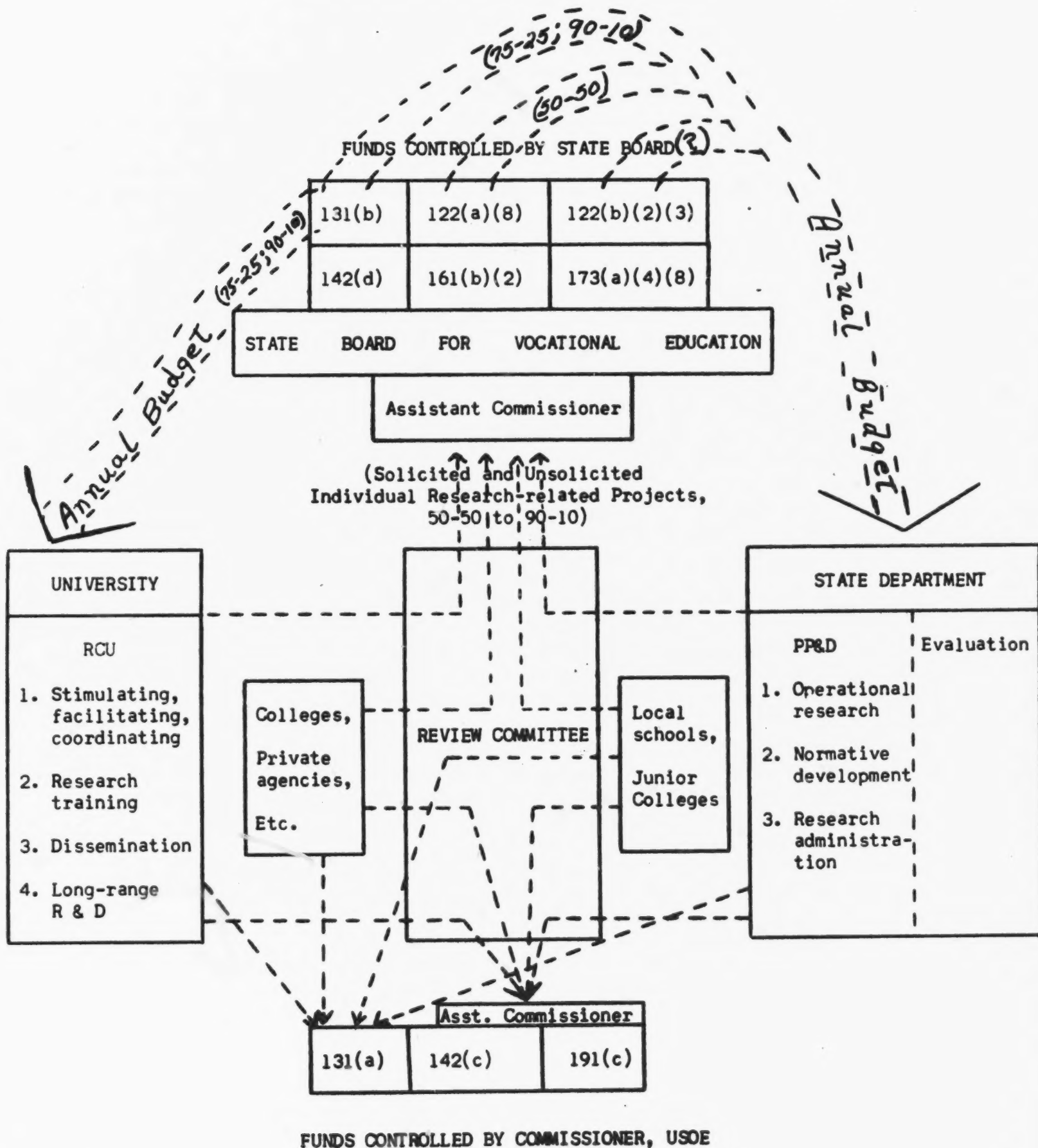
In addition, the Commissioner, USOE, will retain certain research-related funds available for awards to institutions and agencies, irrespective of their geographical source. The authorizations include: Section 131(a), research and training; Section 142(c), exemplary programs and projects; and Section 191(c), curriculum development.

One of the ways to perceive the use of all of these funds by the research-related subsystem in a state is depicted by Figure 2, "Research-Related Funding Relationships".

You can study the Figure at your leisure, so only a few of its salient features will be pointed out here. First, the continuing sources of funds available at the state level are utilized to support the continuing activities of a Research Coordinating Unit (in a University), and a Program Planning and Development Section and an Evaluation Section (in the vocational division of the State Department). All three units will operate on annual budgets. Second, the remaining funds available to the state will be used to support solicited and unsolicited projects emanating from any organization or agency in the state; the proposals for all such projects will be reviewed by the Review Committee before being forwarded with recommendations to the state's Assistant Commissioner for Vocational Education. Third, as far as it is legally possible, all proposals from organizations in the state which are being submitted to the Commissioner, USOE, for funding shall first be screened by the Review Committee and then transmitted to the USOE through the Assistant Commissioner.

Figure 2

RESEARCH-RELATED FUNDING RELATIONSHIPS



II. Annual Planning

As stated previously, research-related functions can be thought of as broad goals which provide general direction to activities, but which can never be achieved. The research-related subsystem has the never-ending task of improving the effectiveness and efficiency of occupational education programs. It is in the annual planning, however, that the endless task takes on specific form, as well as short- and intermediate-range objectives. Through the translation of functions to activities, personnel, and costs--that is, planning, programming, and budgeting--the role of the research-related subsystem is materialized.

A. Funding Research-Related Organizations vs. Individual Projects

One of the first decisions required in building a research-related subsystem is the relative fund allocation to be made to research-related organizations (such as the Research Coordinating Unit, the Program Planning and Development Section, and the Evaluation Section) and to individual solicited and unsolicited projects. In other words, how much of its estimated dollar resources for research-related activities should a state spend to support the continuing activities of specified personnel at the state level, and how much should it make available to those who wish to submit project proposals through the Review Committee? After each state has made a conservative estimate (or even several estimated levels) of the gross income available for "research" over a five year period, there are several factors that might well affect the decision.

First, certain functions, like research administration, dissemination, evaluation, and stimulation - facilitation - coordination must be centralized under some state level organizational structure. In addition, most states should probably insure some minimum level of operational research, normative development, long-range applied research, innovative development, and research training activities. Maintaining some activity in every function is indeed essential to the operation of the total subsystem and to guaranteeing some output.

Second, the status of available human resources in the state for undertaking the latter group of functions is an influential factor. The larger the number of researchers, the greater their competence, and the more diverse their location, the less need there is for centralizing the functional activities. Contrarily, the smaller the number of competent researchers, or the more they are already concentrated in one location, the more beneficial and economical it usually is to institutionalize their efforts and insure continuity.

Third, with a certain degree of optimism, we can look forward to increasing research-related appropriations. Skilled help is hard to find and research organizations need time to tool-up so that appropriations can be used efficiently. This would argue for giving first priority to the immediate development of such organizations as the Research Coordinating Unit, Program Planning and Development, and Evaluation, and later in the first five year period increasing the allocation for individual projects.

Finally, in light of almost unlimited research needs, the maximum level of funds which should be allocated to each research organization can, perhaps be best estimated by prior experience. Taking into account past performance efficiency and considering the new opportunities and constraints likely to be imposed in the years ahead can yield some practical judgments. It is well to remember, though, that while research service organizations may gain efficiency with size, the so-called "critical mass" needed for the production of creative products is usually much smaller. In fact, beyond five or six professionals, organizational size may be inversely related to individual creative production.

B. Determining Activity Priorities

At least once each year the Research Coordinating Unit should have responsibility, as part of its stimulation - facilitation - coordination function, to ascertain the level of intensity and the general direction or kind of activities that consumers of research-related products feel are needed in the state. The results of this survey should be used (a) to guide state level research organizations (like the Research Coordinating Unit) in their selection of activities, and (b) to formulate a priority list of activities for stimulating and reviewing individual solicited and unsolicited projects.

There are many techniques for carrying out this intent, so the following should be considered illustrative only.

It may be most meaningful to begin the process by developing not one, but perhaps as many as six separate lists of needed kinds of activities. Each list should be directly related to a research function and be formulated by the specific public(s) most closely associated with its products. For example, state and local management personnel, planning specialists, and the State Advisory Council might be asked to suggest and then rate for importance a list of kinds of information they want for decision-making purposes. Since the collection of special information is an activity of operational research, the list would then be forwarded to the research organization which had that function (in Minnesota, it would be the Program Planning and Development Section). Every function is important to the long-range impact of the total program, therefore the PP and D Section would normally include some minimum level of operational research activities in its annual program of activities. Consequently, the Section would examine the suggested list and then decide upon the one or more activities it deems most productive. The selection need not be limited to the activities on the suggested list, but would also take into account the Section's (a) total range of anticipated activities, (b) potential resources, and (c) knowledge of ongoing activities in this and other states. The suggested list, together with comments from the PP and D Section, and notice of the activities to be undertaken, would then be returned to the Research Coordinating Unit.

In a similar manner, other lists of needed kinds of activities would be formulated by selected groups, and then examined and supplemented by the appropriate research organization, in such functional areas as

(a) curriculum and instructional material development, (b) research problems, (c) dissemination, (d) evaluation, and (e) research training.

Thus, the Research Coordinating Unit would possess six lists of suggested, rated activities, together with the comments of the research-related organizations directly concerned. The Research Coordinating Unit could then utilize the Review Committee as the final arbiter in a process of (a) consolidating the specific suggested activities into areas or groups of activities and problems, (b) weighting the relative importance, at that point in time, of the research-related functions, and (c) combining activity area ratings with the relative weights of functions to yield one consolidated priority list.⁵ Throughout this final stage the Research Coordinating Unit staff would bear the major burden of relating the suggested activities to those being conducted in other parts of the country. For though the focus of the state's efforts must be on the state's needs, it cannot afford to ignore the implications of its actions upon other states, and vice versa.

The judgmental process should be carried forward one final step. The most useful form of the priority list would create three categories. First, the activity areas in which projects should be solicited-- obviously consisting of critical needs in the state. Second, high priority areas to which approximate amounts of funds are to be earmarked. Under typical conditions, these two categories would contain those activity areas which are most closely and directly related to the operating program, and which have greatest promise for yielding prompt pay-offs in program and improvement. Third, a completely non-earmarked category to which funds are also assigned. This last category is at least as critical as any other, and should always be available. It serves three important purposes; it permits funding the best, most creative proposals regardless of their priority level, and is justified by the patent need for great improvement in all areas of occupational education; the category also provides a contingency fund with which to coordinate and otherwise manage the individual projects which have already been funded; and it encourages the conduct of those projects which will add to the fund of knowledge upon which future, continuing programmatic improvements can be based.

C. Program Budgeting

The activities in which the research organizations are to engage, and for which individual projects to be funded (solicited and unsolicited), must be translated into expected costs. These costs should be estimated each year for the succeeding five years,⁶ and should be displayed in such a fashion as to relate research functions to project and program activities and to costs.

The procedure advocated in this paper for selecting organizational activities and for designating priorities for individual research-related problems and activities will associate functions with activities. The remaining problem of program budgeting consists primarily of translating proposed activities into personnel and other costs.

1. Organizational Budgets--Assume that a tentative decision has already been made to devote some approximate amount of the total expected state resources for research-related activities to the operation of research organizations, such as the Research Coordinating Unit (and in Minnesota, also the Program Planning and Development Section and the Evaluation Section).⁷ The next steps in the budgeting process would be: (a) Estimating the approximate amount of typical activities in each function that can be performed by one staff member, and the average cost of supporting him and those activities; (b) deciding upon the relative amounts of activity required by each function in accordance with perceived long-range needs in the state (at least five years); and (c) thus determining the approximate level of activity, staff size, and annual cost that should be designated to each function (within the constraint of the approximate total allocated to institutional activities). Since functions have already been assigned to organizations, an estimate of reasonable staff size and operating budget for each organization, with some expectation of production, can also be made. Of course, the original decision to allocate a certain proportion of funds to all organizational activities may be found to be unrealistic, and can be reduced or increased somewhat in light of these latter considerations. Prior experience with research organizations is invaluable both in making annual projections and in deciding upon the proper overall level of organizational activity in the state.

The process of estimation explained so far, coupled with giving first priority on available funds to research organizations, will insure a minimum level of activity each year in each function. The specific activities to be conducted by each organization in each function each year should be selected by the personnel of that organization in the manner described earlier in this paper.⁸ The effective limit on the number of activities chosen is determined by staff size.

After selecting the new activities to be begun in a given year, and tentatively choosing those for subsequent years, each organization can carefully prepare a program budget. The budget should be projected for five years, and include ongoing activities, those to be started in the first budgetary year, and those which may be undertaken in subsequent years. Each activity can be associated with its function, and the anticipated costs of each activity can be shown. The cost of administering the supervising organization activities can be shown as a separate activity.

Two rates of reimbursement are anticipated for research organizations under the 1968 Amendments. A seventy-five percent rate should be used for the salaries and benefits of staff, indirect or overhead costs, and general operating expenses.⁹ Ninety percent reimbursement should be allowed on expenses in direct

support of specific activities (excluding the seventy-five percent items). Figure 3 presents an illustration of a portion of a five-year program budget for a Research Coordinating Unit.

Note that, with a simple reorganization, the program budget can be converted to a typical budget arranged by objects of expenditure, e.g., personnel, indirect costs, etc., for use in ordinary accounting procedures.

2. Individual Projects--The state's research-related funds that are not designated for the operation of research organizations in the state will be available to support individual solicited and unsolicited projects and programs.

It is possible for states to commit from each fiscal year's funds enough money to cover the total reimbursable expenses of each approved project. Since many projects will extend beyond a given fiscal year, this practice may result in leaving unexpended (but committed) funds in each fiscal year. It seems more efficient for the state, therefore, to commit funds only to one year's activity of each approved project, and to approve enough projects to utilize all the money available to the state for that year. This practice reduces the financial security of each project, but it enhances the management options available to the state. The recommended practice also requires that (a) project proposals be carefully budgeted by fiscal year, and (b) the state take into account the expected continuing costs of approved projects when building the annual program plan and budget.

Assuming, then, that the state will attempt to fund as much activity each year as its available funds will permit, the following steps might be taken in building five-year program budgets for individual solicited and unsolicited projects: (a) the difference between the total amount of funds available to the state for research-related activities and those needed to sustain the operation of its research organizations during each of the five years is determined; (b) the continuing annual cost of ongoing approved projects is estimated and allocated to the appropriate "solicited", "earmarked", and "non-earmarked" categories¹⁰ of priority activities¹¹; (c) the annual cost of undertaking and continuing new projects in the "solicited" category is approximated for a five year period; (d) the amount remaining for each year is divided among the "earmarked" and "non-earmarked" categories; and (e) funds in the "earmarked" category are tentatively allocated to activity or problem areas based upon their relative priorities. These decisions should be made annually by the Review Committee¹².

Figure 4, "Program Budget: Solicited and Unsolicited Individual Projects", illustrates one way in which the results of the allocation procedure just described might be recorded. It is the

Figure 3

PROGRAM BUDGET: RESEARCH COORDINATION UNIT

Item	FY '71			FY '72			FY '73
	Total	Fed.	State	Total	Fed.	State	Total
I. Function: Stimulation - Facilitation - Coordination							
A. Activity: Technical Constultation: Project Review							
1. Personnel							
a. Researcher (25% over 36 mos. @\$16000/yr.)	\$4000	\$3000	\$1000	\$4000	\$3000	\$1000	\$4000
b. Clerical (10% over 36 mos. @\$5000/yr.)	500	375	125	500	375	125	500
2. Benefits (10% of salaries)	450	338	112	450	338	112	450
3. Indirect costs (20% of salaries)	900	675	225	900	675	225	900
4. General operating (10% of total)	585	414	171	585	414	171	585
*5. Travel of Review Committee	840	756	84	840	746	84	840
*6. Conference facilities	120	108	12	120	108	12	120
Sub-total	\$7395	\$5666	\$1729	\$7395	\$5666	\$1729	\$7395
B. Brochure: "Application Procedures for Research Funds"							
1. Personnel							
a. Researcher (1% over 12 mos. @\$16000/yr.)	160	120	40				
b. Clerical (1% over 12 mos. @\$5000/yr.)	25	19	6				
2. Benefits (10% of salaries)	19	14	5				
3. Indirect costs (20% of salaries)	41	31	10				
4. General operating (10% of total)	25	19	6				
*5. Duplicating	700	630	70				
*6. Addressing and mailing	100	90	10				
Sub-total	\$1070	\$923	\$147				
C. Study: "Assessing Research Resources"							
1. Personnel							
a. Researcher (20% of 12 mos. @\$17000/yr.)				\$3400	\$2550	\$850	

* 90% Federal reimbursement.

Figure 4

PROGRAM BUDGET: SOLICITED AND UNSOLICITED INDIVIDUAL PROJECTS

	FY '71	FY '72	FY '73	FY '74	FY '75
Est. total funds available to state	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
*Est. total funds allocated to organization operation	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
Est. net funds available for individual projects	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
I. SOLICITED					
A. Continuing Activities					
1. Name of function: Name of activity	XXXX	XXXX	XXXX	XXXX	
2. Name of function: Name of activity	XXXX	XXXX			
B. New Activities					
1. Name of function: Activity or problem	(XXXX)**	(XXXX)			
2. Name of function: Activity or problem		(XXXX)	(XXXX)	(XXXX)	
II. EARMARKED					
A. Continuing Activities					
1. Name of function: Name of activity	XXXX	XXXX	XXXX		
B. New Activities Areas (by priority)					
1. Name of function: Activity or problem area	(XXXX)	(XXXX)	(XXXX)	(XXXX)	(XXXX)
2. Name of function: Activity or problem area	(XXXX)	(XXXX)	(XXXX)	(XXXX)	(XXXX)
3. Name of function: Activity or problem area	(XXXX)	(XXXX)	(XXXX)	(XXXX)	(XXXX)
III. NON-EARMARKED					
A. Continuing Activities					
1. Name of function: Name of activity	XXXX	XXXX	XXXX		
B. New Activities Areas	(XXXX)	(XXXX)	(XXXX)	(XXXX)	(XXXX)
TOTALS	(XXXXXX)	(XXXXXX)	(XXXXXX)	(XXXXXX)	(XXXXXX)

* Taken from organizational budgets.

** (XXXX) indicates estimated allocated costs.

kind of budget that would be maximally useful to the Review Committee, and that could guide the stimulation efforts of the Research Coordinating Unit.

Finally, the budgeting procedure could culminate in one combined five-year program budget for all the research-related activities in the state. Such a budget would contain a composite of the information presented in the separate organizational budgets and the individual projects budget. It might appear something like Figure 5, in which function, activity and cost are directly related, and in which the apportionment of support to the various organizations and to individual projects can be readily ascertained.

With a budget display like Figure 5, the managers of the research-related subsystem can readily and directly answer the following key questions: What functions are being carried out by the subsystem? What specific activities are to be conducted, or problem areas attacked, in each function? What resources will be used for each function and activity? When do you expect some results? And the managers will also be in a position to explain the rationale and means for selecting the proposed activities.

III. Some Implications of the Proposed Subsystem

A. Federal Regulations

In order to properly implement and facilitate the proposed research-related subsystem, it is recommended that the federal regulations should:

(a) Encourage each State Plan to contain one part which would deal with all of the nine research-related functions noted in this paper. That one part of the Plan would, therefore, explain how the State would carry out the provisions of the following sections of the Vocational Amendments of 1968: Section 122(a) 8; Section 122(b) 2 and 3; Section 131(a) and (b); Section 142(c) and (d); Section 161(b) 2; Section 173(a) 4 and 8; Section 191(c). (b) Provide that the part of each State Plan dealing with research-related activities shall be reviewed and approved by the Division of Comprehensive and Vocational Education Research in cooperation with the Division of Vocational and Technical Education, and that a desk in the DCVER be maintained for the purpose of providing liaison, promoting cooperation, and assuring voluntary coordination among the states and between them and the Bureau of Research. (c) Permit the operation of more than one organization in each state, devoted to the conduct of legitimate research-related activities, at the basic reimbursement rate of seventy-five percent for regular personnel, benefits, indirect, and general operating costs.¹³ (d) Permit a reimbursement rate of ninety percent for all expenditures directly attributable to the conduct of specific identifiable research-related activities (excluding regular personnel, benefits, indirect, and general operating costs) conducted under the auspices of Section 131(b), even when the expenses are incurred by Research Coordinating Units or other similar organizations. (e) Permit the State Board to transfer funds from Part B to Part C, if, in its judgment, the additional funds are required to support the research efforts.

Figure 5

PROGRAM BUDGET: RESEARCH-RELATED ACTIVITIES

	FY '71		FY '72		FY '73		FY '7
	Fed.	Other*	Fed.	Other	Fed.	Other	
I. FUNCTION: OPERATIONAL RESEARCH							
A. Program, Planning and Development							
1. Name of activity							
2. Name of activity							
B. Individual Projects							
1. Solicited: Name of activity							
2. Unsolicited: Name of problem area							
II. FUNCTION: NORMATIVE DEVELOPMENT							
A. Program, Planning and Development							
1. Name of activity							
B. Individual Projects							
1. Unsolicited: Name of problem area							
(Etc.)							
X. ADMINISTRATION AND SUPERVISION							
A. Program, Planning and Development							
B. Evaluation							
C. Research Coordinating Unit							
XI. UNEARMARKED							
TOTALS							

* Varying reimbursement rates would be applicable.

B. Evaluation of the Research Subsystem

It is beyond the scope of this paper to attempt a solution to the difficult problem of evaluating the efficiency of the research-related subsystem. There is an obligation, however, to make explicit the need to attend to the evaluation problem and to point out some of its dimensions.

Since the role of the research subsystem is to improve occupational education programs, it is logical to measure the subsystem's overall effectiveness in terms of the rate and quality of change it effects. The kinds of difficulties that are present in making such an objective overall evaluation are at least threefold. First, there is the problem of measuring a reasonable range of the subsystem's many outputs, such as (a) the cumulative impact upon teaching of increased understanding of the learning process, (b) the value of specific information in improving management decision-making, or (c) the influence of research training upon the usefulness of research results. Second, with the subsystem in operation, a suitable comparative base is not available; it does not seem feasible to provide research services to half the state and not the other half, nor are there likely to be school systems who can, even if they wanted to, isolate themselves completely from all knowledge about potential educational changes. Third, the factors which influence change are probably manifold but have not yet been identified, and so attributing specific outcomes solely to the activities of the research subsystem must be done with extreme caution.

What may not currently be feasible for the subsystem as a whole may be applicable to specific activities within the subsystem. Thus, it may be reasonable to objectively compare the relative benefits and operating costs of a specific new and an old program with the cost of developing the new program. Cost/effectiveness analyses may also be practical with some other kinds of research-related activities.

For some time to come, however, evaluation of the research subsystem, as a whole and in part, will undoubtedly be subjective. It therefore appears worthwhile to suggest some of the judgmental criteria that may be applied (not necessarily with equal weight) to the products of the subsystem.¹⁴ (a) Relevance--the degree to which products are pertinent to the needs of occupational education; (b) significance--the degree to which products are addressed to and have succeeded in helping to resolve important immediate and long-range problems; (c) scope--the number and the range of problems to which the products are pertinent; (d) creditibility--the degree of confidence which potential users have in the products; (e) timeliness--the degree to which the product is opportune to potential users; and (f) pervasiveness--the degree to which the product is made available to potential users.

IV. Summary

At the risk of aggravating the result of an overly long and tedious presentation, it does seem the less of two evils to provide a brief summary of the major theses contained in the paper.

"Research" should be considered a subsystem whose role it is to facilitate improvement in the total system of occupational education. The "research" subsystem gains its inputs from the planning, the operations, and the management subsystems, and feeds its outputs--information, knowledge and usable products--back to those subsystems.

In order to carry out its role, the "research" subsystem must perform a set of interrelated functions. The functions, which may be considered broad goals or categories of activity, are: (a) Operational research, (b) normative development, (c) program evaluation, (d) stimulation-facilitation-coordination, (e) innovative development, (f) applied research (long-range), (g) research administration, (h) dissemination, and (i) research training. More properly speaking, therefore, the subsystem consists of "research-related" activities.

The nature of the activities called for by each function tend to dictate the type of environment best suited to their conduct. Further, most, if not all, of the functions require that they be institutionalized at the state level in order to insure some minimum amount of continuous activity in their behalf. It is therefore recommended that the functions of operational research, normative development, program evaluation and research administration should typically be placed in the State Department of Education, while the remainder should ordinarily be performed by a college or university. Coordinating mechanisms, to insure proper linkages at the state level, between the state and local levels, among states, and between the states and the federal government were suggested.

In light of their several functions, the state level research organizations (one of which would be a Research Coordinating Unit) should draw federal support from many sources authorized by the Vocational Education Amendments of 1968. And, while the organizations should receive first priority on available resources to sustain some minimum level of operation, state-controlled funds should also be available to support solicited and unsolicited individual research projects.

It is recommended that the Research Coordinating Unit have responsibility for administering a representative Review Committee. The Committee would screen and make recommendations about all proposals either requesting state-controlled funds or being submitted through the state to the Commissioner, USOE, for direct federal funding. The procedure would help insure needed coordination of research-related activities within the state.

Annual planning should treat the research subsystem as one unit. As a first step, a procedure for identifying and rating the various kinds of activities considered important by appropriate publics was suggested. The research organizations would use this information, together with other considerations, to select their next year's and prospective (up to five years) activities. The Review Committee would then utilize the remaining suggested, rated activities to formulate a priority list of activity or problem areas. For convenience and utility, it is suggested

that the priority list be divided into a "solicited" category of specific activities, an "earmarked" category of activity or problem areas, and a "non-earmarked" category.

Having selected the specific short- and long-range activities in which it will engage (constrained by staff size), each research organization is then able to prepare a program budget in which costs are related to specific activities and activities are related to organizational functions. The research-related funds available to the state that are not used to support organizational activities can then be allocated by the Review Committee (a) to specific projects to be solicited from persons in the state, (b) to activity or problem areas for supporting unsolicited proposals, and (c) to the "non-earmarked" category for funding creative research-related ideas regardless of problem area or when the results might be applied.

By combining the problem budgets for the research organizations and the individual solicited and unsolicited projects a unified picture of the research-related subsystem can be obtained. The summated program budget would reveal, at a glance, the functions served, the activities to be conducted in the interest of each function, the resources designated to functions and activities, and the amount of resources that have been allotted to each research organization in the research subsystem.

In conclusion, four recommendations are made concerning the nature of the federal regulations which should govern the administration of the Vocational Education Amendments of 1968, and some of the problems attendant to the evaluation of the subsystem are briefly discussed.

Footnotes

1. Keith Goldhammer presented this summary of sources of education problems during a discussion at a "Developmental Project Guidelines Conference" held in Minneapolis, Minnesota, June 13-15, 1968.
2. Jerome Moss, Jr., The Evaluation of Occupational Education Programs, Technical Report 3, Minneapolis, Research Coordination Unit in Occupational Education, University of Minnesota, September, 1968, p. 14.
3. Egon Guba and David Clark, "An Examination of Potential Change Roles in Education", Paper Presented at the N.E.A. Conference on Innovation in Planning School Curricula, Airlehouse, Virginia, October 2-4, 1965.
4. The method for developing the priority list will be explained in the section of this paper entitled, "Determining Activity Priorities".
5. Input from the State Advisory Council will be obtained in the process of developing the initial lists of suggested activities to be performed.
6. Five year projections of activities are required by the Act.
7. Factors entering into this decision have already been discussed in part II, A of this paper.
8. See part II, B of this paper.
9. General operating expenses may include such items as office equipment rental, office supplies, communication expenses, and travel of staff in the organization's general interest.
10. It should also be recognized that the permissible reimbursement rates for research-related activities varies according to the authorizing section of the Act, and that this factor will also influence the cost of projects to the state.
11. See part II, B of this paper.
12. It should be noted that the nature of research-related activities lend themselves to gradual, rather than to abrupt, changes in priorities. It takes time to generate solicited and unsolicited project activity in a given problem or activity area, especially when competent research personnel are limited in number. Also, much of the funds for a given year may be needed to support continuing projects, thus tending to reduce annual flexibility.
13. Item 102.137 in the January 1969 draft of Vocational Education Amendments of 1968, Rules and Regulations could be revised as follows: "...the establishment and operation of State research coordination units and units in other State agencies and institutions responsible for conducting programs of vocational education research and dissemination, and to programs...".

14. Many of these criteria were suggested by Dan Stufflebeam in his presentation, "Adequacy of Evaluation Theory", at the Annual Meeting of the American Education Research Association, February 8, 1969.

STRATEGIES FOR EMPHASIZING THE UTILIZATION OF LOCAL ENVIRONMENT
IN COMMUNITY ACTION RESEARCH

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Perhaps this topic, Strategies for Emphasizing the Utilization of Local Environment in Community Action Research, more than any of the others, lends itself to philosophizing. Certainly the intensive use of the procedure has been somewhat infrequently applied in the world of education.

Community involvement has generally encompassed, for the most part, the PTA. Our scope is now broadening, however, and we are gradually lifting the barriers which excluded the public from our efforts. Among the inclusions we now find: School Community Lay Advisory Committees, Business and Industry Advisory Committees, the traditional PTA, and its new counterpart, Parent-Student Associations.

This presentation will not give in-depth treatment to the involvement of the total community and its multiple resources for this represents a Herculean assignment and one hardly possible within the circumscribed time.

A brief attempt will be made to underscore the highly desirable utilization of the business and industrial community, but a major emphasis will direct your attention to a much broader community--a community whose visibility is almost nil--a community that must be aroused (favorably aroused) and brought into concerted involvement and constructive action if educators and education are to be successful in their and its efforts. To this latter community we have assigned, quite literally, the term "local environment".

In researching the subject of utilization of community resources, considerable data on methodologies and/or strategies was found within our state and through an agency known as CATI--Community Action Training Institute. Copies of numerous case studies or position papers on strategies toward community involvement are available through this service and as a part of this presentation, a bibliography of useful documents is included.

I must admit that my first reaction to the call for participation in this conference was one of skepticism. Why are we in the middle of a cold February and under the ominous threat of a massive snow storm in Oklahoma City, a somewhat remote site for many of us. I think this question is worth probing just a bit before going into the heart of my presentation.

The topics of the five speeches you have already heard provide an interesting clue, and certainly the implications of a conference of this magnitude merit the kind of soul searching that I have done.

For each of the six discussion topics, one key word acts as a spring board. That word is "strategies". Strategy implies serious, technical

planning. Planning for future action. Exactly what this action is to be, however, is not made clear. No previous groundwork has been set for any pending innovations or changes in the Vocational Education system which could rationalize the calling of a series of national and regional meetings. So there still remains the question, "why?" Perhaps a short examination of the Vocational Education Amendments of 1968 can provide us with a few more insights.

Section 104 of the 1968 Amendments mandate the creation of a National Advisory Council on Vocational Education. Of that council, no less than one-third of the membership is to be comprised of what will be basically non-professional or community people. The groundwork is there set for present emphasis which is being placed on community involvement in the planning and execution of Vocational Education programs. A later section allows for the creation of a similar State Advisory Council. And again, community representation is stressed.

Two sections of the legislation are, by implication, directed to New Careers programs being incorporated into Vocational Education.... and specifically in the area of research and pilot programs. Section 131, Part C of the amendments designates that a portion of the 50% of the total funds allocated for "Research and Training in Vocational Education" be expended on "experimental, developmental, or pilot programs developed....and designed to meet the special vocational needs of youths, particularly youths in economically depressed communities who have academic, socio-economic, and other handicaps that prevent them from succeeding in the regular vocational education programs." Part D of the legislation, which covers Exemplary Programs, details basically the same type of program funding for experimental projects to bridge the gap between school and employment.

Further into the legislation, section 306 provides for a Program Consolidation Study. Commissioner Carl Marburger has successfully administered such a consolidation within our New Jersey State Department of Education. Within the Department, the Divisions of Adult Education and Vocational Education have merged. The question emerges, what justifies such a study on a national level?

Section 308 outlines a Job Corps Study which, determined feasible, would result in the removal of the existing Job Corps facilities and programs from the Office of Economic Opportunity and their transfer to the Office of Education. Other language in the legislation suggests that this could be implemented through a state of joint Federal-State operation in conjunction with the program of Residential Vocational Education.

And the legislation doesn't stop there....the very next section, 309, details a study which provides for the transfer of the Head Start operation from the Office of Economic Opportunity to the Office of Education. You may ask why the Head Start Vocational Education marriage in this act? Briefly and succinctly, this wedding supports our own theory of early initiation to the world of vocations.

At the time we were preparing this message, these referenced transfers were only eminent. The Sunday, February 16 issue of the New York Times carried a story considerably more definitive....that story reported that at the culmination of this fiscal year the transfers will be implemented. The referenced programs, according to this report, will be transferred to Health, Education, and Welfare with the first not specifically delineated as destined for the Office of Education, but with a certain assignment of the second to that office. A check with our Office of Elementary Education on the day of my departure left me with a bold question mark as to the receptivity of that office to this prospect. Could such transfers affecting other disciplines provoke a similar response?

A worthwhile analysis of even these few facts can be drawn. The harbinger of the future seems to be alerting us to a pending shift in both the delegation and execution of responsibilities. Could the very language of the 1968 amendments be telling us that within the next few months, we as educators will be called upon to deal with and tailor our mode of functioning to the grass roots population? That we must begin listening to their needs rather than assigning them? That we must start the assembly line production of vehicles of communication with the under-developed community?

The successful give and take of two-way communication with the citizens of our under-developed communities is a skill that can only be obtained through work, practice and a willingness to understand the magnitude and complexity of the problems they face.

Do we, right now, have all the tools and skills needed to go into an under-developed community and assess the needs of the community? Could we research, locate and utilize the existing resources within that same community? And those resources are available, but they have not been harnessed and developed to provide any real support or aid either to its residents or to us, that we may function better on their behalf. And, if we can accomplish these two tasks, could we then develop and carry out a meaningful vocational education program based on these needs and directed toward the wealth of undeveloped community resources?

Our individual answers to these questions should give us some small idea of the immensity of the task that lies ahead. The education facilities of the nation are poorest precisely where they should be best. It has been estimated that 50 to 75 percent of slum children are failing to get even a minimal high school education in our public school system. Reams of figures are available; but it is unnecessary to site them. In terms of preparing disadvantaged children to make use of American opportunity, our educational resources are sadly under-developed. Realizing this, we must face this simple truth, that people are a community's most valuable resource and we must mobilize these resources to make society more responsive to the need for a tremendous expansion and recasting of public school education.

How then and where do we begin this utilization of local environment--those abundant community resources. Asked, "Where does the campus end

and the community begin?" J. Paul Leonard, then President of San Francisco State College replied, "It's better if nobody can quite tell." That is the ground from which we should proceed in education; for education of the disadvantaged cannot be contained within the structured confines of a classroom. Even the briefest observation of children today shows that education is not confined to the schoolhouse, but rather, education in America equals factors plus the influence of the schoolhouse.

The education of disadvantaged children requires new and imaginative approaches geared to the experiences of these children and relevant to the problems which they will actually face. Meeting this requirement will invoke the need for research.

Consider for a moment the strides that we could make if schools would lengthen both their vision and their reach. A sparkling example of an extended reach has been demonstrated in Operation Headstart. The program was hastily contrived and often non-professionally staffed and operated. Yet it has proven that the cognitive effectiveness of children can be radically improved. Many of these programs are school based but a significant number of them "crop up" in churches, storefronts, apartment houses, and elsewhere. Some are short-term summer projects and others operate the year around.

Higher Horizons and Upward Bound inspired by some universities have exhibited an outreach from the simple subject matter and purely intellectual approach to that of cultural stimulation and self-concept enrichment--and the approach has worked.

Vocational education has pioneered in the utilization of the business and industrial community but our inroads into that community need expansion and fuller application. Unquestionably, vocational education programs should have a much larger involvement with community resources. This might well take the form of work experience where in most of the learning stations will be in the community and most of the equipment will be that of community enterprises. We and they will be partners in planning and coordinating a relevant vocational education program and at the same time, involved in the enrichment of education opportunity for a presently unserved student population. The expansion of this program should dictate more research in the efficacy of cooperative education, sheltered workshops, employment orientation, and industry school adoptions.

There are other such community oriented classrooms on Main Street. Educational progresses are being recorded by many federal, state, and private agencies and organizations. Privately conceived and operated agencies such as the Opportunities Industrialization Centers are achieving a very real purpose of preparing people for jobs and advancement on those jobs. These centers punctuate the tri-state area of Pennsylvania, Delaware and New Jersey. In fact, a proliferation of delegate agencies are conducting educational projects and activities including private no-profit organizations, churches, business firms, political subdivisions within the community, and other specialized state, federal, and local public agencies such as welfare departments. Among their component

activities are found day care and pre-school programs, literacy courses and other adult basic education, employment programs for persons over 60, consumer education, employment and manpower training, youth employment and activities, and neighborhood centers controlled by neighborhood residents and providing a variety of services and activities as determined by the residents. Examples are sidewalk academies and mobile training and learning laboratories. ...And, they are using approaches which attract and are palatable to those who need training. Are these not sterling examples of community action research which we might adopt?

But, let us return to that invisible community--the community which represents untold wealth in community involvement.

President George Meany of the AFL-CIO aired his views on the subject of community involvement when he stated in a different but related context, "The war on poverty was never intended to be a dole for the poor, but rather was conceived as an opportunity for the poor to become involved in anti-poverty programs to assure the fact that these programs respond to their real needs." Education is, by far, the most important anti-poverty program.

A representative of the poor from our Southern United States made this argument for community involvement and the ability of the constituency to help map out their own programs. "...people learned coming off the plantations that they could make some decisions. This brought dignity to the people; they argued--they learned that they could argue with one another and try to reason and found that they could make some decisions for themselves."

I am reminded here of a very real happening in Bridgeton, New Jersey.

For weeks the city had been divided between black and white, poor and affluent, over the decision of low income parents to conduct their own headstart program rather than subcontract the program to the local school system, at that time undergoing internal stress and court proceedings centered on segregation. The school officials had issued an ultimatum; either the school ran the program or it would shut its doors and refuse use of its classrooms. The parents cast about for substitute facilities--only to find room severely limited in the once-prosperous farming center. Desperate, the parents invited the pastor of the city's leading church to attend a meeting and hear their plea for space.

At the meeting, the minister took the side of the school officials, firmly insisting that he felt the parents unqualified to conduct the program. The meeting came to a standstill. The room fell quiet with frustration.

In one corner sat an aging black farmer--grandfather of several children eligible for the headstart program and to this point, quiet throughout the discussions. The man, whose father and grandfather before him had been local farmers, leaned across the table.

"Reverend," asked the farmer, "why do you say we are not qualified to run the program?"

The minister smiled. "Well," he replied, "no one doubts your good sense, but the fact is that to run the program, qualified teachers must be hired, and it is obvious that the qualifications of such teachers can be judged best by people who are themselves educated and experienced in these matters."

"Reverend," rumbled the farmer, "you are wrong. When my grandchildren have to have their appendix taken out, or their teeth, fixed, I am the one who must decide which doctor or dentist is best qualified to do the job, even though I don't know anything about medicine. And if I am qualified enough to decide on doctors and dentists, then why am I not qualified to decide on teachers?"

The minister was graceful enough to concede logic when he saw it. He later championed the cause of the parents and was instrumental in securing the needed facilities for the program.

Perhaps the most unique contribution of this invisible community lies in its power to inform and validate our efforts. It constitutes a source of special insight, of information, of knowledge and experience which cannot be ignored if we are concerned with whether our efforts are fulfilling our aims.

A review of the past and present of Vocational Education would seem to indicate that we have been operating in a vacuum. Even though Vocational Education overlaps into many other fields of federal and state program development, we have thus far been functioning as an isolated and independent entity. We develop our educational programs from our own opinions and ideas of the under-developed community's needs. This is an unrealistic approach to say the least. As professionals and educators living and working in the higher social strata of centrally air-conditioned office buildings; efficient, well dressed secretaries; Harvard graduate peers; and programmed perceptions of what "poor folks" need and want, how can we honestly assume and indeed insist that we really know what is relevant to the under-developed community that we drive through on our way to work from our suburbia, or "golden ghetto" as it is sometimes called.

Because this newly stressed concept of community involvement is foreign to most of us, we can reasonably anticipate the advent of problems in accepting and adapting to this new concept. But the very human tendency toward resistance to change can hardly be accepted as valid in the face of such irrefutable facts as these. Quite simply, from the mandates of P.L. 90-576, we are going to have new demands placed upon us in the not so distant future. We are going to need new skills and facilities which we do not now possess. We are going to be dealing more and more with the "real" people. The people of the under-developed community who need "real" help....in short, the nitty gritty, with whom few among us have established dialogue or communication.

A major portion of the leg work which a program of this caliber entails is found in the research it requires. The nature of research, true research, demands a special set of attitudes. By definition, research is a "careful, systematic, patient study and investigation...undertaken to establish facts or principles." Obviously, this definition would automatically invalidate the kinds of study we often perform under the erroneous heading of and with the funding for research. It does not include the kind of situation we find ourselves in when we choose one of our pet theories and then proceed to move heaven and earth to find bits and remnants of data which would effectively support our pre-conceived notions.

The problem for research then will be an investigation of how we can redirect our purposes and strategies so as to become positive forces for effective operation in this new arena.

We suggest that our efforts and those of research should have the following concerns and in these concerns lie strategies for change.

1. The validation and exploration of increased opportunities for enlarged parent and community participation in public education as co-planners, as sounding boards, and as evaluators of our efforts.
2. The exploration and validation of re-orienting vocational education, emphasizing work experience training and the involvement of business and industry. We suggest that this can be done through building in employment orientation, work experience, exploration in sheltered workshops and industry-school adoptions.
3. The exploration and validation of developing curriculum approaches, materials, and teaching strategies which will make the needed general and vocational studies meaningful and desirable to the student with limited potential. We need to know the methods, teaching materials, class scheduling, staffing (including non-school personnel), facilities and approaches which might be helpful in this attempt.
4. The exploration and the validation of developing lines of communication and dialogue with the under-developed community, locating agents of communication. Permit me to emphasize this research concern for I believe it to be most important if we are to be successful in working with the masses of disadvantaged. The involvement of people who can bank suspicions and gain confidence is a much needed resource.
5. The exploration and validation of the existence of community resources and in instances where these are found to be minimal, continued effective research can determine an alternative method of approach. There is always a way--our task is to find it.

In this legend of the Genie and the Fisherman, let us equate the Genie with the masses of the disadvantaged and see ourselves as the fisherman.

It is said that once a wondrous Genie was imprisoned in a bottle for many centuries, drifting across the seven seas. After several hundred years, the Genie resolved to reward the man who should free him of his captivity with fabulous

gifts. As time passed, he decided that he would, in fact, bestow upon his liberator any and all things which might be pleasing to him, and that he would take his benefactor as his master, and serve him faithfully forever.

Centuries more passed, and the Genie remained imprisoned, and with the passing of time so too, did the good will of the Genie pass, until at last he became so enraged at his fate that he swore a great oath to put to death the man who should release him from the bottle, as punishment to all mortals for not having freed him much sooner.

One day the bottle washed ashore and a kindly fisherman, seeing the Genie within the bottle, removed the cork and set him free. Instantly, the Genie grew to monstrous size, until his mighty shoulders crowded the sky. His brow was black with the anger of past centuries, and the earth shook as he thundered at the frightened fisherman.

"Puny mortal," roared the Genie, "hear your miserable fate. Because you did not come sooner, you shall die!" And, with no further ado, he scooped up the shaking man into his gaint hands and made ready to dash him to his death.

The fisherman, according to legend, thought with furious speed. "Hear me, O Genie," he shouted. "If you must take out your revenge on me, grant me at least the right to choose how I shall die." The Genie thought for a moment and then, with a great roar of laughter that shook loose the trees from their roots, he put the fisherman down upon the beach. "Very well, little man," he chuckled, "so much you shall have. I grant you the right to choose the manner of your death. But, be quick with it, for time has become precious to me." "Then be gone with you, ungrateful wretch of a Genie," replied the fisherman, "for it is my wish to die of old age!" And with that, he ran for home with all of his might.

Will we always be able to run for home? The bottle is open, and the Genie is out, and we must, with the fisherman, think of our survival!

Suggested Reading

- "A Comprehensive Bibliography on New Careers and the Use of Sub-professionals in Human Services", University Research Corporation, 1424 16th Street, N.W., Washington, D.C.
- "Community Action Training--A Handbook for Trainers", New Jersey Community Action Training Institute, 2465 S. Broad Street, P.O. Box 4078, Trenton, New Jersey 08610.
- "Focus on Community Action", A Report of the National Advisory Council on Economic Opportunity, U.S. Government Printing Office, Washington, D.C., March 1968.
- Hatch, H. Richard, "Children as Urban Planners: A Center Report", Center for Urban Education, The Urban Review, Vol. 2, No. 2, December 1967.
- "Head Start Newsletter", Office of Economic Opportunity, Washington, D.C.
- "New Careers Newsletter", New Careers Development Center, 239 Greene Street, New York, New York 10003
- Parker, Glenn M., "Can We Create New Careers for the Poor", Training and Development Journal, October, 1967.
- Pruger, Robert, "The Establishment of a 'New Careers' Program in a Public School", Community Action Training Center, School of Criminology, University of California, Berkely, California.
- Shaffer, Anatole and Harry Specht, "Training the Poor for New Careers", Contra Costa Council of Community Services, Walnut Creek, California, March, 1966
- Simms, Gregory F., "A Study of Ethnic Representation in Illustrations and Subject Area Relevance to Environment of Elementary School Texts", available from New Jersey Community Action Training Institute, 2465 S. Broad Street, P.O. Box 4078, Trenton, New Jersey.
- "The First Step...On a Long Journey", Congressional Presentation, Office of Economic Opportunity, Vol. 1, U.S. Government Printing Office, Washington, D.C., April, 1965.
- "Use a Survey to Fight Poverty", New Jersey Community Action Training Institute, 2465 S. Broad Street, P.O. Box 4078, Trenton, New Jersey.

SUMMARIZATION OF SMALL GROUP DISCUSSIONS

It is necessary to briefly describe the recording format of the conference that the reader might understand what is included and what is not included in this summarization.

1. Questions and reactions addressed to the topic of the paper were solicited from the total assemblage following each of the major paper presentations at the conference. These sessions were tape recorded but have not as yet been transcribed. They are not a part of this summarization.
2. Following the question and reaction session, participants of the conference were divided into eight small groups to give opportunities for each individual to react to the presentation and to offer additional ideas relating to the development of the handbook. The small group sessions were not tape recorded by the project staff, although in some cases, the reporter did tape record the discussion in his own small group. Each reporter was asked to (a) prepare an oral report of the small group discussion following each presentation, and (b) at the close of the conference, prepare a written summary of all the sessions of his small group.
3. At the conclusion of each small group discussion, the total group was again brought into session, and each reporter made his oral report to the conference. These reports were tape recorded but have not been transcribed. They are not included in this summarization.

The presentation which follows is a reorganization of 2.(b) above, i.e. it is a consolidation of the written summaries of the reporters. The reporters, preselected from Research Coordinating Units, were Richard A. Baker, Alabama; Ray Barber, Texas; Virginia Bert, Florida; Norman D. Ehresman, North Dakota; George P. Pilant, Washington; Herbert Righthand, Connecticut; John F. Stephens, Utah; and Kenneth M. Wold, Iowa.

The attempt to integrate the written summaries of the reporters emphasizes the diverse individual interpretations of the Act, the Rules and Regulations, and the major presentations at the conference. Opposing statements occur at several points--at the same time, there are many recommendations which were supported by several or all of the small groups. One must realize that duplicate ideas are avoided in this presentation--that this is only a compilation of all the different points found in the summaries.

It should be noted further that these concepts are necessarily taken out of context from the discussions. However, they are only one source of information for the handbook. It is the responsibility of the project staff, as they write the handbook, to use many resources

including: (a) the tape recorded discussions and presentations by the consultants at the conference, (b) reactions and discussions at the regional clinics, (c) communications received by the staff from many interested educational researchers, and (d) materials such as those available from the Ad Hoc Committee on Dissemination, Center for Vocational and Technical Education, Ohio State University.

PARAMETERS OF RESEARCH

1. Vocational education research should be interpreted as activities which include: investigating educationally oriented problems relevant to vocational-technical education; gathering operational and planning data; developing new materials, practices and institutions to improve instructional practices; demonstrating the feasibility of utilizing new materials, processes and institutions; organizing training programs to develop and upgrade the research competencies of vocational-technical education; and disseminating research and research-related information to selected audiences through appropriate printed materials and utilization conferences.
2. Research and the products of research are necessary inputs in maintaining, extending, and improving existing programs of vocational-technical education and for developing new programs. Guidelines should state how this might be possible.
3. The function of research is to provide the data essential to the planning and operation of vocational education. Research should not be limited to the aspects identified as Part C of the Act.
4. Define research as more than adding knowledge to what is known. It is an attitude of change which is willing to seek "a better way" of doing things.
5. Research includes diffusion - basic research is needed to provide a workable model for diffusion; applied research is needed for adapting the model to local situations.
6. Research has a relationship to education, planning, exemplary programs, and curriculum development as referred to in the Act.
7. The two types of research (basic and applied) will usually require different resources and research competencies. Insofar as research administration is concerned, the handbook should establish some operational guidelines.
8. An appropriate operational guideline for basic research could be stated as all those activities designed to produce knowledge about the fundamental processes of learning including the social context as well as the organization and administration of the instructional enterprise as it relates to the target groups served by vocational-technical education.
9. Applied research could be operationally defined as activities designed to develop and demonstrate new practices, materials, processes and organizational forms for vocational-technical programs. This definition is intended to include the type of research mentioned in the bill as developmental, pilot, and exemplary programs.
10. Research, as it fosters the attitude for innovation in exemplary programs or demonstration programs, carries with it very little evaluation.

11. What constitutes collection and assimilation of data should be differentiated from research.

STATE AND LOCAL ROLE IN RESEARCH

A. Administration

1. Organization of the state plan for research should include:
 - I. General statement of policy.
 - A. What is research and development.
 - II. Description of activities
 - A. Research coordination.
 - B. Functions of the state.
 - III. Arrangements for research and development activities
 - A. State Research Coordinating Unit
 - B. Research, experimental, developmental, pilot, and exemplary programs.
 - VI. Standards for Research and Development Activities
 - A. Establishment of priorities - the state should annually identify significant researchable problem areas. The areas should probably be developed in the form of priority statements in consultation with local, state, and university level personnel and the state advisory council.
 - B. Submission of applications.
 - C. Application reviews.
 - D. Waiver of standards and requirements in special cases.
 - E. Plans for providing for continuing research and development through adequate fund allocation. Considerations should be given to specifying a given percent of funds coming to the state to be allocated for research and further breaking down the total percent to percent for various types of research.
 - F. Plan for research by preparing long-range budgets for projects based on state research and development priorities.
 - V. State Information Center
 - A. Responsibility for operating.
 - B. Services to be provided.
 - VI. Developing research competencies
 - A. State and University level personnel
 - B. Local level personnel
 - C. Inventory of research capabilities in the state
2. Some activities for RCU's can be generalized. Criteria for writing and evaluating proposals submitted to the State for funding could reasonably be standardized.

3. The RCU should be considered the state agency for project management of all vocational research in the state.
4. The state RCU should evaluate the research sponsored through its funds. When implementation is possible, ensuing action should be noted.
5. Action on local and state studies should be based on coordinated efforts of the RCU and State Director. RCU's external to the State Board of Education should have written agreements with the State Director describing procedures of funding, priority identification, approval procedures, etc.
6. An RCU should be a staff operation - not a line operation in the state department.
7. Guidelines should include reference to the RCU function in research and development by its own personnel.
8. The RCU should coordinate local Research efforts.
9. There is not enough time to hire expert researchers and they are not available. We must train the practitioner and employ itinerate teams of evaluation experts from universities or large city systems.
10. Guidelines should refer to use of expertise from the RCU for stimulating or encouraging, counseling, and planning the development and conduct of research.
11. Research personnel inventories (local, area, state, regional, national) are important in providing a base for developing and conducting research.
12. Applications approved should require periodic progress reports. Projects or programs not progressing as planned should be assessed and recycled in order to fulfill, at least in part, objectives set forth in the application.
13. Federal guidelines should permit states to negotiate with any research agency in the performance of educational research, whether those agencies are in the public or private domains, and whether they are profit or non-profit oriented.
14. Monies transferred to the Labor Department for manpower needs studies should be used in accordance with State Vocational-Technical Department and local planning needs.
15. Employment Security has the capability and responsibility for determining manpower needs.
16. Coordination with Employment Security people is a problem. They do not reach out into the community far enough to reflect the employment needs.

17. Local administrative plans should reflect provisions for research and development functions.
 - a. In-service programs.
 - b. Financial assistance for innovative programs.
18. Local and area vocational schools should be encouraged to provide time, opportunities and, in larger cities, staff to conduct research.
19. Approved proposals should be communicated to other states in the region to enhance cooperative action and avoid duplication.
20. Section 102.73 of the Rules and Regulations states: "The State Plan shall provide that within 15 days after the state board approval of a grant or contract the state board shall forward to the Commissioner a copy of the approved proposal..." This should not be required by USOE. If DVTE or DCVER is interested in state funded proposals, arrangement should be made to report studies in process in that section of the ERIC Research in Education as a part of the system.

B. Priorities

1. Research activities at any level (local, area, state, regional, national) should be components of a research needs model developed from identified priorities. Priorities and the order of priority should be determined by the combined efforts of groups which can provide necessary inputs. Research needs models should be evaluated and revised annually.
2. The State should be mandated to survey the state for the purpose of establishing research priorities and to provide inventories of research personnel having expertise in conducting and consulting in research.
3. Application for project research should be received and approved on basis of state level priorities.
4. The identification of state priorities should be drawn from the practitioner level rather than imposed by the State Department of Education.
5. Local people do not have the inputs needed to establish priorities--for example, manpower projections. Local people can establish priorities on problems which must then be evaluated to see if they are researchable problems.
6. A feedback subsystem of the dissemination system might be useful for the purpose of constructing priorities based on local needs.
7. Vocational research at the state and local level should be "applied," i.e., problem oriented and growing out of perceived needs and having some connotation for immediacy.

8. Priorities for funding should include research in orientation to occupational education. Guidelines should emphasize vocational exploration at any level.
9. Manpower studies are needed at all levels.
10. Studies are needed to further define effective ways of diffusing the results of research programs to local school officials. Pilot programs should be encouraged as dissemination agents.
11. What will be the relationship between industry and the placement of graduates from the local school system at all levels? Whose responsibility is the follow-up and record-keeping function on graduates of a school system? Develop criteria for justifying vocational programs on the basis of graduates' performance on the job.

C. Training

1. Congenial attitudes toward performers of research and implementers of research should be insured by making provision for training programs, seminars, conferences, etc. for all persons at all levels.
2. Workshops or seminars should be conducted to provide practitioners with an understanding of fundamentals of research. This may develop sufficient interest and understanding for them to initiate and conduct research and/or to read, understand and utilize research.
3. Research monies for the training of researchers is available from other sources, e.g., the Education Professions Development Act.
4. Research training should include room for differential staffing... with different people trained to perform different jobs. Emphasis should be placed on people trained to make use of completed research, i.e., evaluators, processors, etc.
5. Research instruction and the use of research findings should be an integral part of professional education courses on the undergraduate level or as part of courses for the certification of vocational teachers.
6. Action oriented conferences may be held to discuss, interpret, and plan implementation of findings.
7. The new advisory committees need presentations on planning techniques in order to participate effectively in the preparation of state plans.

D. Application

1. The RCU shall develop procedures for the contracting of research projects, pilot programs, etc.
2. Application for research funds should be made for both project and program research.
3. Application for research programs (development, pilot, and exemplary) funds should include statements regarding how local system personnel, including the power structure (decision-makers), are going to be involved.
4. Plans for research should be designed to enable any level of vocational-technical educators to submit their research problems to the research division and to obtain assistance with their problems.
5. Make proposal preparation easier at the local level by first accepting abstracts.
6. Application for all research funds should include a research management plan for each project or program.
7. Research dissemination should be written into every project.
8. Reference should be included in guidelines to the available expertise for counsel in development, conduct and evaluation of research.
9. Application critique services should be provided to interested individuals. This service should consist of assistance in research design and methodology, data analysis techniques, and evaluation methodology.

E. Review

1. Application for research funds should be reviewed by unidentified field readers having special knowledge, experience or qualifications with respect to vocational-technical education needs; organization and administration of vocational-technical education; and research design and methodology.
2. A review committee should have a permanent membership and ad hoc membership depending on the type of study. The permanent review committee should consist of RCU and State Director representatives as well as other members of the research community. Ad Hoc members might be vocational administrators, subject area specialists, teachers, industrial representatives and resource people from other agencies. The nature of the proposal would determine this representation.

3. Proposal review teams could also carry out evaluation in their respective areas of competence. This would cut down on needs for full time state staff.

F. Funding

1. Must have a continuing commitment for each state to research-- regardless of level of federal funding.
2. Researchers must be money hunters and work with groups like the industrial development commissions in all states.
3. Funding needs to be comprehensive and extensive to the top priorities until answers have been obtained.
4. Some research may be funded on the basis of proposals submitted in response to a state request for a specific study, e.g., an evaluative procedure for nurse aide programs.
5. Other contracts or grants may be issued as a result of a request for proposals dealing with a broad priority area, e.g., studies dealing with disadvantaged youth.
6. A grant or contract may be negotiated by selecting the research agency most able in the context of the study.
7. Local levels should do applied or action R & D activities and be developing attitudes which lead to cooperation with other researchers.
8. The State Department (or RCU) should not conduct basic research unless other research resources are not available and the basic research is related to a high priority local problem.

STATE AND LOCAL ROLES IN
ACCOUNTING AND DISSEMINATION

A. Organization and Administration

1. Some state unit in vocational-technical education (RCU) should develop an occupational information system for collecting and integrating manpower needs and available for local administrative units. It should be noted that local data should be combined on an area and regional basis for multi-unit program planning. Manpower data should be reported and translated in forms that can be related to vocational-technical training programs. This system could be a part of the state information center (system) consisting of both document and data information.

2. While need for a comprehensive state information system is recognized, in the initial stages, we need a system identified as a vocational-technical education information system.
3. The mechanism (state, area, local) for facilitating dissemination should be identified; the type, staff, facilities, products and services. This should be identified with the RCU.
4. If the RCU is not in the state department, the information system should have a vocational-technical arm to support decisions of the State Director.
5. Guidelines should specify that objectives for the state information system would be compatible with those of the national system--particularly Central ERIC and VT-ERIC.
6. A state agency (RCU) should act as the clearinghouse for state information into the ERIC system.
7. The state system should go beyond the state in coordination efforts with other state systems and national systems.
8. The state and local agencies must be encouraged to consider dissemination (and implementation) from a systems viewpoint to include orientation, training of teachers, and use of facilities. Dissemination must include more than a distribution of printed documents. Demonstration projects or pilot programs are useful in dissemination and should be available in pre-service training programs. Research personnel must adequately plan and perform public relations functions to assist in diffusion of new programs.
9. Mass dissemination through mass media is necessary at some point to make the general public aware of vocational education efforts. The public relations office of the state department may have appropriate duties here.
10. Dissemination from the information system should recognize the value of the human element. Methods of dissemination should be related to user groups.
11. Provisions for research interpreters or application "engineers" should be sought in order to proceed beyond the mere distribution of research findings.
12. Activities need to be organized to insure that data reaches decision makers before it is time to make the decision.
13. The system should be designed for two-way communication.

B. Strategies

1. Identification of problems--determining which approach to use for users (current, everyday, exhaustive, brush-up, or browse). Each of the approaches will probably require different packaging.

2. Ways to involve decision makers (how to inform the superintendent).
3. List resources available to the local agency which relate to vocational education research.
 - a. data such as follow-up records;
 - b. people or groups such as PTA, service clubs, etc.
4. Note Ohio Ad Hoc committee efforts.
5. Selective dissemination (specific audiences) - Doug Towne's SDI.
6. USOE interpretative packaging projects.
7. Dissemination of research findings through specially prepared packages for specific user groups.
8. Guidelines should make a reference to the priority of dissemination--products and services--to the respective users and user groups.
9. Dissemination to the industrial or business community.
10. Pilot programs may be used as a means of presenting research findings in action.
11. Use of research utilization conferences on the local level for vocational personnel.

FEDERAL RESPONSIBILITIES

A. General Recommendations

1. A basis for dialogue should be maintained between the State, USOE, and the two Centers, namely, research development and training in occupational education and research and leadership development in vocational-technical education to enable a referral of researchable topics to one of the three levels for action. Referral to the national level should be encouraged for topics having national concern.
2. Percentage of general (non-categorical) funds should be increased for vocational education research. Broad research policies should be established at the national level and the states should be given broad latitude to spend federal allocations within these guidelines.
3. Federal level should support basic research as well as conduct or support programatic types of R & D efforts.
4. The main responsibility for BASIC research should rest with DCVER.
5. Projects of regional and national scope should be referred to DCVER for funding.

6. DCVER should work with representatives of DVTE in considering regional or national studies.
7. A channel of communications should be established which permits a state or a consortium of states to influence the schedule of research undertaken by national research agencies under the jurisdiction of USOE.
8. USOE should consult with the State Director and the RCU when considering support of vocational research within a particular state.
9. USOE should play a key role in the coordination of state research.
10. USOE should establish "request" channels for priority problems encountered by states, and assign national researchers to undertake these programs.
11. Involve users of research at all levels in advisory capacities to USOE.
12. Establish administrative guidelines for developing cooperative education programs between industry and education.
13. Relate national research program in vocational-technical education with research programs of other federal agencies involved in educational programs.
14. A publication should be sponsored at the national level which is read by industries interested in educational research, so that states can advertise requests for proposals for surveys, evaluations, etc.

B. Regional Offices and National Centers

1. Define the role of regional USOE offices in vocational education research and development.
2. USOE should consider inputs from the states in arriving at decisions such as the desirability of regionalization.
3. The two Centers should continue their role as dissemination centers and be involved in studies of a theoretical and generalizable nature.
4. Pre-service and in-service research training opportunities should be provided the states by USOE and the two national vocational-technical centers.
5. There should be criteria developed for the evaluation of RCU's and the two Centers. The DCVER and DVTE should cooperatively set general goals for the two Centers.

6. USOE should consider the need for institutions of research other than the RCU. There may be need for different approaches to vocational research.
7. Problems for USOE or the two Centers include: population mobility studies; accreditation of teacher education; emerging occupations; national labor information...job requirements, educational inputs and outputs.
8. Investigate the possibility of involving business and industry in evaluating vocational-technical student competencies.

C. Dissemination

1. The ERIC system needs a new type of abstract format which briefly describes the research project and its results. Something more detailed than the present abstracts and less technical and shorter than the completed report.
2. Development of a common base for reporting information and the coordination of information coming from states.
3. USOE should develop and disseminate vocational curricula.
4. A national reporting (accounting) system that meets the data needs for national and multi-state program planning needs to be developed.
5. USOE should provide information to the states relative to the availability of research funds under other federal agencies and acts.
6. Development of a communication system between industry and education to indicate needed commercial educational products for vocational-technical education is a necessity.